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1) All articles intended for publication should be submitted to the editors before the deadline which is usually six weeks before the release of the Journal.
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3) Illustrations, graphs, diagrams and figures should be put on a separate sheet and identified by Arabic numerals. A list of explanatory legends for all the figures and diagrams should be put on another sheet. Do not write on the back of photographs.
4) References should be checked with the original sources, designated by raised Arabic numerals in the text, and listed in alphabetical order on a separate sheet. Each periodical reference should include in order: the author's last name and initials, title of the article, journal name, volume number, page number, and year (e.g. Risser JC: Scoliosis: Past and Present. *J Bone and Joint Surg* 46 (A): 167, 1964). For further information please consult the MLA Stylesheet.
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Of Students, Stress, and Chemicals

H. W. Henderson M.D.,C.M.
Deputy Registrar

Dr. H.W. Henderson is a graduate of Queen's University, and received a gold medal from the University of Toronto on completion of the Diploma Course in Psychological Medicine. He also holds a specialist certificate in Psychiatry from the Royal College of Physicians and Surgeons of Canada, and has held a number of senior positions in the Ontario Ministry of Health dealing with Mental Health Services in the Province. In 1976 he was appointed Deputy Registrar of the College of Physicians and Surgeons of Ontario, and in 1977 he initiated a Project for Doctors on Chemicals which dealt with the special needs and problems of physicians who develop a dependence on alcohol and drugs.

The ability to cope with stress comes more easily to some than to others. Those who choose a career in medicine can be sure that these qualities will be put to the test. Unfortunately, some students regard their preparation for a career in medicine as an ordeal which must be endured to enjoy a comfortable life as a doctor. It would be more realistic for them to see the undergraduate experience as an opportunity to develop some of the personal strengths they will require as well as medical knowledge and skills.

The keen competition and demand for a high level of scholastic performance which was required to enter medical school will continue to be felt throughout the undergraduate years. In addition, there are new time commitments, pressures and responsibilities. In the early years there is an enormous mountain of information to be absorbed. The clinical years bring the student into close contact with death and disease and add increasing responsibilities for direct patient care. There is little time for family, friends and leisure activity. The resulting isolation is hard for the students who are married, and for their families. The lack of personal freedom may be even more difficult for those who are alone in unfamiliar surroundings with no time to make new friends and enjoy former interests and activities.

The ability to relate comfortably to other people, and a sensitivity to the pressures and demands of the responsibilities which they carry, are important aspects of providing care and treatment. Apart from the instruction given in the context of the doctor-patient relationship, there is little opportunity, or encouragement, for medical students to develop their social skills and prepare themselves for the roles and responsibilities they will assume in their home and family life.

Alcohol and drugs are readily available and used by a large segment of society to feel more comfortable. Students are no exception. In the course of their studies, they will be taught to prescribe drugs to relieve pain and discomfort. It is estimated that one in ten of the graduates will suffer impairment from a misuse of alcohol or the self-administration of drugs at some time in their professional career.

Based on present knowledge, a dependence on chemicals is not related to any particular type of personality or kind of stress. For reasons that are not yet understood, some people appear to be more vulnerable to a dependence than others, and show a different pattern of use and response to alcohol and mood altering drugs. Genetic factors are suspected, and a familial history is frequently present. Physicians, and those studying to be doctors, are believed to be more at risk because of the severe pressures to which they are exposed and their easy access to drugs.

In order to give proper attention to their professional duties and responsibilities, physicians must avoid any personal misuse of alcohol or drugs. They should also be alert to the signs of a developing dependence on the part of a colleague. It is very difficult for anyone to overcome a severe dependence without help. Doctors have their own problems which

make it more difficult for them to get the help they require. Treatment programs which give particular consideration to the special needs of physicians are available, and provide a high rate of recovery. Those who do well in treatment will find they have to make a number of changes in their lifestyle. Not infrequently, the lifestyle adopted as a student and an early experimentation with alcohol and drugs can be identified as significant factors which contributed to the dependence and resulting impairment of physicians who were well established in their career. □

MEDICAL ETHICS ESSAY CONTEST

Students are invited to submit original essays on topics of their choice.

DEADLINE: March 1st, 1982
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SUBMIT TO: the editor,
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PRIZES: $50, 30, 20

Winning entries will be published in the Medical Journal.

Faith Healing

Robert Kyle B.Sc. 8T3

The existence of non-medical forms of healing when viewed in the face of all that modern medicine has to offer, suggests that the sufferer derives some worthwhile benefits which may be lacking from medicine. This article briefly acquaints the reader with the area of faith healing so that an appreciation is acquired as to why, as a non-medical healing form, it exists. To do this, faith healing as a category of occult healing is presented as a form of psychotherapy mediated through a sanctioned healer, which brings relief to the sufferer through a variety of possible mechanisms.

The healing arts can be roughly divided into two rather broad categories: medical & non-medical. The latter term is non-specific and can be used to classify such healing forms as chiropractic, hydrotherapy & occult healing. Not withstanding the myriad of achievements of which modern medicine can boost, these alternative forms of healing continue to exist. This suggests that medicine may not fulfil certain essential needs pertaining to the sufferer and that careful consideration should be given to these other types of healing before dismissing them out of hand. This article, then, is a reflection about the question, 'Why do these alternative forms of healing exist?"; and faith healing as a representative non-medical healing form will be the ultimate focus of attention.

Occult Healing

Lee[1] states that *suggestion* is an element of every healing art such that an idea is introduced into a person's mind with the aim of the idea being accepted without the use of a critical argument or rational persuasion. The amount of suggestion present lies on a continuum from the situation in which it may be combined with the scientific method of diagnosis and analysis (and thus lying within the realm of medicine) to the opposite extreme in which it plays the major role and other forms of scienfic intervention are either incidental or absent. Lee[1] adds that "when suggestion is the scientifically observable operative phenomena of a non-scientific system of healing which is based on mystical or religious explanation of disease and healing, (one is) in the realm of *occult healing*." Often the usefulness of diagnoses and analyses of pathologies may be either denied or ignored, but "occult systems to have a suggestive therapeutic effect (observable fact) regardless of the actuality of existence of sources of healing power believed in by these groups." According to Lee' one of the three major categories of occult healing groups existing in Ontario is "fundamentalist faith healing groups which have combined the idealist doctrine of mind cure with primitive Christian miracle - working (eg. Oral Roberts)." The next sections will deal with the broader topic of occult healing before focussing in on the more specific one of faith healing.

Psychotherapy

Frank[2] defines *psychotherapy* as only those types of influence characterized by: (1) a trained, socially sanctional healer, whose healing powers are accepted by the sufferer and his social group or an important segment of it, (2) a sufferer who seeks relief through the healer, & (3) a circumscribed, more or less structured series of contacts between the healer and sufferer, through which the healer, often with the aid of a group, tries to produce certain changes in the sufferer's emotional state, attitudes, & behaviour. Although physical and chemical adjustments may be used, the healing influence is primarily exercised by words, acts, and rituals in which the sufferer, healer, and if there is one group participate jointly.

Most occult healing systems satisfy these criteria and although they differ widely in their claims and doctrine, all may be considered as forms of psychotherapy.

Frank[2] has suggested how the therapeutic benefits derived from psychotherapy are actually

achieved: "in short, when successful, all forms of psychotherapy relieve dysphoric feelings, rekindle the patient's hope, increase his sense of mastery over himself and his environment, and in general boost his morale so that he becomes able to tackle the problems he has been avoiding." The central point, then, is that the therapeutic efficacy of various healing techniques may not result from their specific contents, which differ widely but from their functions, which are the same.

One usually associates the field of psychotherapy with the area of mental illness. There is no doubt that modern medicine, has made much progress into the area of the treatment of mental illness through such techniques as psychoanalysis, electroconvulsive therapy, etc. but it claims fewer successes here than with physical illness. Frank[2] notes that it has been impossible to demonstrate with convincing evidence that one therapeutic model is better than any other. In fact specific effectiveness of psychotherapy for most forms of mental illness has not been proven. Hence the treatment of mental illness is fertile soil in which the opportunistic occult groups may grow and expand. It is when they claim effectiveness equal to that of medical techniques in areas of physical illness that one would expect opposition from the medical profession.

However, medical and occult healing forms of psychotherapy should not be viewed as being at the opposite ends of the spectrum. On the contrary, the two may have evolved from the 'pastoral care of historical background. For example, Szasz[3] views all forms of modern psychiatry as having evolved from the 'pastoral core of souls' or "the sustaining and curative treatment of persons in those matters that reach beyond the requirements of animal life." He adds that "the 'disorders' of the soul are sins; the guide of souls diagnoses the patient's case in terms of sin, and applies the remedies of rebuke, counsel and penanace. When the disorders of the soul are defined as disease, the patient's care is diagnosed in terms of psychopathology, and the remedies now become constraint, electricity, and chemistry."

To summarize then, occult healing tends to rely heavily on the power of suggestion and can be thought of as a form of psychotherapy. All systems of occult healing share a religious-based origin not only amongst themselves but with medicine as well, and in their subsequent evolution have diverged.

Mechanisms of Action.

As Lee[1] says, "most forms of psychotherapy must be somewhat efficacious, otherwise they would dissolve away". Possible underlying mechanisms accounting for the benefits derived include the following:

1. occult healing, which by definition has a large suggestive component, may operate via a placebo effect;

2. the effectiveness of occult healing might act through an interplay with various types of bodily stress, such that "in some manner not yet undersood, (it) assists the patient in establishing a higher-level homeostatic equilibrium in which the patient has less 'need' of stressful, diseased conditions"[1];

3. occult healing may strenghen the patient's natural healing powers, usually by establishing an intense healer — sufferer relationship and through a large psychological component which arouses the patient's hope, bolsters his self-esteem, and stirs him emotionally.

Faith Healing

Having dealt with occult healing specifically as it relates to psychotherapy, faith healing as an example of an occult healing form will be looked at. A detailed discription of the healing and charismatic revivals in North America is beyond the scope of this article, but the reader is directed towards, *All things are possible...* by Harrell[5] for further information.

Kiev[4] states that "all methods of faith healing share the basic premise that recovery depends upon supernatural forces that affect all illnesses equally...Healing based on magic utilizes exhortation and mobilizes religious and personal emotional enthusiasms. (The faith healer) operating in a religious context (sees himself) as forgiving the supernatural forces to bear on the patient, with (himself) acting primarily as a conduit for them." The faith healer and sufferer enter a dominant - submissive relationship whereby the supernatural powers of the former validate his use of manipulations over the latter. The healer tries to induce changes in the patient's level of consciousness and to alter his mood. The healer's emotional hold over the sufferer allows him to introduce suggestions that may contradict and/or challenge the logic of the sufferer. "Thus the operation of suggestion in this sense is always dependent on the human relationship behind the ideas, a relationship which induces the patient to abrogate his right to judgment."[4]

A close interplay of assumptive systems and emotional states is present in methods of faith healing and there is also an intimate relationship amongst both of these, health, and illness. Frank[2] notes that methods of supernatural healing "bring out the parallel between disorganization and disturbed relations with one's group and indicate how a patterned interaction of patient, healer, and group within the framework of a self-consistent assumptive world can promote healing."

Another feature shared by faith healing and other secular therapies is the ability to evoke the expectancy of help. Frank[2] mentions that there are two discernable sources of expectancy:

1. the personal magnetism of the healer, often strenghened by his own faith in what he does; and

2. the ideology of the healer which offers the sufferer a "rationale", however absurd, which helps the sufferer make sense of his illness and the treat-

(continued on page 110)

Diet for the Patient with Short Bowel Syndrome: High Fat or High Carbohydrate?

Graham M. Woolf 8T3
K.N. Jeejeebhoy M.D.,F.R.C.P.(C)

Eight patients with short bowel syndrome due to previous ileal and colonic resection were maintained for a total of two weeks on two separate diets in a randomized cross-over study. One diet was high in fat (HF) and provided 60% of total calories as fat, 20% as carbohydrate, and 20% as protein. The other diet was high in carbohydrate (HC) and provided 60% of total calories as carbohydrate, 20% as fat, and 20% as protein. Both diets were lactose free and low in fibre.

No fluids were administered one hour before, during, or after meals, and total fluid intake was held constant.

On these regimens no statistically significant differences in hemoglobin, serum electrolytes, BUN, blood sugar, total proteins, serum albumin, and liver function tests were observed. Stool volume, Na, K, urine output, and urine electrolytes were also compared. While fecal fat content was higher with the HF diet, bomb calorimetry demonstrated that total calories excreted were comparable in the two diets. It is concluded that low fat diets have no special benefits as far as absorbtion of calories, fluid, or electrolytes are concerned. Nor was there a reduction in diarrhea with the low fat (HC) diet. It is therefore recommended that there be no dietary restriction in patients with short bowel syndrome.

Short bowel syndrome is caused by resection of 50% or more of the small bowel. This extensive loss of small bowel leaves insufficient surface area for the absorption of nutrients and fluids. The loss of bowel is subsequently compensated for by a process of adapatation which involves lengthening of villi, thickening of the bowel wall, luminal dilation, and decreased transit time. All these effects help to reduce diarrhea and improve absorption.[10]

The degree of functional recovery following bowel resection depends upon the length of remaining bowel the site of resection and the nature of the underlying disease which necessitated the bowel resection.

Based on earlier observations[4,11] it is now common clinical practice to prescribe low fat/high carbohydrate diets to patients with a short bowel. However, such studies were not controlled for fluid intake, timing of fluid in relation to meals, and fibre content in the diet. Our own unpublished data have suggested that these variables are important in altering absorption of food and influencing severity of diarrhea.

The present study was designed to observe the relative merits of fat versus carbohydrate in individual patients while keeping the intake of protein, fibre, and fluids constant. Furthermore the effects of lactose and timing of fluid administration in relation to meals was controlled.

Materials and Methods

Patients: None of the patients showed any evidence of active inflammatory bowel disease, and all had been clinically stable for at least 6 months. Intestinal barium series confirmed radiologically that five patients had undergone total colectomies, and that three had right colectomies. All patients had greater than 50% of their small bowel resected. The details of the study were approved by the Review Committee on the Use of Human Subjects at the University of Toronto. The patients all gave informed consent to participate in the study.

Protocol: The patients were admitted to the Clinical Investigation Unit of the Toronto General Hospital and placed on diets which were isocaloric, isonitrogenous, and provided a constant intake of protein, fluids, and fibre for the duration of the study. All medications were kept constant, and the diets were lactose free. Fluids were only permitted one hour before or after meals, but not with meals. Four patients were randomly assigned a high fat (HF) diet for one week and then crossed-over to a high carbohydrate (HC) diet for a second week. The remaining four patients received the identical regimens, but in a reversed order. The HF diet contained 60% of total calories (75% of non-protein calories) as fat, whereas the HC diet contained

60% of total calories (75% of non-protein calories) as carbohydrate. Due to the cross-over design of the experiment, the effect of dietary fat and carbohydrate on the experimental parameters measured was based on a comparison of each patient with himself or herself, thus avoiding any variation due to intestinal resection or post-operative GI adaptation.

Details of Study:

Day 1: Patients were admitted to the Clinical Investigation Unit of the Toronto General Hospital for the duration of the study to facilitate collection of data. A complete medical history and physical examination were performed. Blood was drawn for baseline analysis, and each patient's dietary history was reviewed by the hospital dietician. Patients were on an "ad libitum" diet for the first 2 days of the study. They were randomized into one of two groups: Group 1 or Group 2.

Day 2: Diets were assessed for total intake of calories and fluid by the dietitian. Continuous 24-hour urine and stool samples were collected for baseline analysis.

Day 3: Patients assigned to Group 1 received the following high fat diet (HF): Carbohydrate-20% of total dietary calories; Fat-60% of total dietary calories; Protein - 20% of total dietary calories.

Patients assigned to Group 2 received the following high carbohydrate diet. (HC): Carbohydrate-60% of total dietary calories;
Fat-20% of total dietary calories;
Protein-20% of total dietary calories

The total intake of calories and fluid of these diets were the same as Day 1 and 2 of the "ad libitum" phase for each patient. Radioactively labelled chromium chloride clearance was used to ensure completeness of stool collection. A continuous 24 hour stool sample was then collected for radioactive analysis.

Day 4, 5, 6, 7: On each day, 24 hour urine and stool samples were collected and the results averaged over the four days. On days 5 and 7 blood was drawn and the results averaged for these two days. By the end of Day 7, each patient had received their first diet for 5 days.

Day 8: Patients on HF were now changed to HC and vice versa.

Days 9, 10, 11,12: On each day, 24 hour urine and stool samples were collected and the results averaged over the four days. On days 10 and 12, blood was drawn and the results averaged for these two days. By the end of day 12, each patient had received their 2nd test diet for 5 days.

Day 13: Patients were discharged from the study.

Administration of Marker to Ensure Completeness of Collection:

Before stool collections could begin, individual transit times and equilibrium periods had to be determined.

Each patient received 10 microcuries of radio-actively labelled chromium chloride in 0.5 units of distilled water p.o. as part of their breakfast on the first day of their first diet. The stool or ostomy contents were counted for radioactivity to determine the time taken for complete ( ) 95%) excretion of ^{51}Cr.

Measurements:

Routine Blood Chemistry was done by the Department of Biochemistry at the Toronto General Hospital.

Urine Electrolytes were alkaline phosphatase SGOT,

Fecal Fat Measurements were performed by the method of Van de Kamer[9] on homogenized 24 hour stool collections.

Fecal Sodium and Potassium was measured by wet ashing of stools using perchloric acid as described previously and the electrolyte content estimated by flame photometry[3].

Total Calories were measured by bomb calorimetry. The food from one day of each patient's diet was homogenized in a blender and a 200 ml sample was freeze dried (Virtis Co. Inc. N.Y., Freeze-mobile 12) and weighed. Approximately one gram of the dried food sample was placed in the bomb calorimeter (Gallenkamp Ballister Bomb Calorimeter). Total calories in the sample were then obtained.

A stool sample (50 ml) from each of the 4 collection days of each patient's diet was homogenized, freeze dried, and weighed. Approximately one gram from each dried sample was placed in the bomb calorimeter. Total calories were obtained from each sample and a mean value was calculated for each diet. When the stool value was subtracted from the food value for the respective diet, total calories absorbed for the diet were obtained.

Statistical Analysis: Results obtained from the two diets were tested for statistical significance using Student's "t" test for paired variables. Values from each diet were averaged for each patient. Data presented are means from all 8 patients.

Results

Intestinal Transit Time: Over 95% of the ^{51}Cr marker was recovered in stool or ostomy output within 3 hours. Hence intestinal transit was rapid and therefore the patient required only one day on the diet before collection could begin.

Dietary Intake of Calories, Protein, Fat, Carbohydrates and Fluid: Based on diet history, the hospital diet was closely approximated to the patient's usual intake as far as fluids and total calories were concerned.

Clinical Effects of the Diet: There were no difficulties with compliance and all patients tolerated both diets well. While on the diets, there were no changes in weight or blood pressure. Also the change from one diet to another did not alter weight or blood pressure.

Routine Blood Chemistry:

All results were within normal limits. There were also no significant statistical differences between the two diets. The following parameters were tested. Electrolytes, BUN, Creatinine,

osmolality, blood sugar, calcium, phosphorus, magnesium, albumin, globulin, total protein, total bilirubin, cholesterol, triglycerides, alkaline phosphatas, SGOT, hemoglobin, hematocrit, RBC, platelets, WBC, Iron, TIBC, Vitamin B_{12}, and Fe.

Urine Volume, Electrolytes, Creatinine and nitrogen:

There were no significant differences in urine volume, creatinine, nitrogen, and electrolyte excretion. (See Fig.[1])

Fecal Weight, Osmolality and Electrolytes:

There were no significant differences in weight, Na, K, or C1 output of the stool or ostomy dejecta. Furthermore the volume of ostomy dejecta were the same with the HF and HC diets (see Fig.[2])

Fecal fat output and fat balance:

The fecal fat excretion was three times greater with HF than with HC, but fat absorbed expressed as a percentage of total intake, was not significantly different between the two diets. (see Fig. 2)

Total Calorie Balance:

There were no significant differences in mean total calorie, fat calorie, and protein plus carbohydrate calorie absorption between HF and HC. It is of interest that the mean percentage absorption of fat and non-fat calories were very similar, averaging about 65% of total intake. (See Fig. 3)

Discussion:

This study was designed to test the hypothesis that dietary fat would have a significant adverse effect on fecal output and absorption.

It is generally believed that a low fat, high carbohydrate diet will result in less diarrhea, less steatorrea, and better absorbtion of nutrients[1, 4, 6, 7, 11]. However, not all studies have supported this concept. Simko[8] showed in a patient with short bowel syndrome that a high fat diet resulted in less diarrea than a high carbohydrate diet. He speculated that the smaller size of the carbohydrate digestion products compared to the triglyceride digestion products may have increased the osmotic load presented to the small bowel, and thus promoted water loss into the intestinal lumen. In addition to fat, other factors such as the amount of fluid ingested are known to influence intestinal water loss[3]; and dietary fibre may also have effects which have yet to be defined[5]. None of the previous studies have been designed to control for these variables.

Fecal Weight, water and electrolyte loss:

In contrast to previous studies we found no difference in fecal weight between the two diets. Since feces is at least 80% water it is clear that in our patient's water loss must have been comparable between the two diets. This was also supported by the constant urine output and maintenance of blood pressure we observed. In addition to loss of fluid, the fecal and urinary loss of electrolytes showed no difference between the two regimens. Thus a high fat diet did not result in more water or electrolyte loss, and the high fat/high water loss hypothesis our hypothesis has to be rejected.

Fat and Calorie Absorption:

As would be expected from a higher fat intake, fecal fat excretion was increased but stool osmolality and calorie content were not higher than with the high carbohydrate diet. Thus total nutrient loss was comparable with the different diets and it is clear that unless protein absorption was different between the diets, there was a comparable degree of carbohydrate malabsorption in these patients. Since urine nitrogen excretion was comparable in the two groups it is unlikely that protein absorption would have been different between the HF and HC diets.

Divalent Cation Loss: It is known that divalent cations such as Ca, Mg, and Zn may bind to fatty acids in the stool. Therefore with greater fat output a greater loss of these cations might be expected. The increase in fat output on the HF diet compared to the HC diet was only 30 grams. This amounts to 106 mEq of fatty acid which in theory could bind 2 grams of calcium. However, similar balances of intake and output of Ca, Mg, and Zn show that the expected loss of these electrolytes in the HF diet did not occur.

Conclusion

It is concluded that low fat diets have no special benefit as far as the absorption of calories, fluid, and electolytes are concerned.

Fat in the diet increases the palatibility of food and encourages the patient to eat more. Hence we recommend no dietary restrictions in these patients.□

Acknowledgements:

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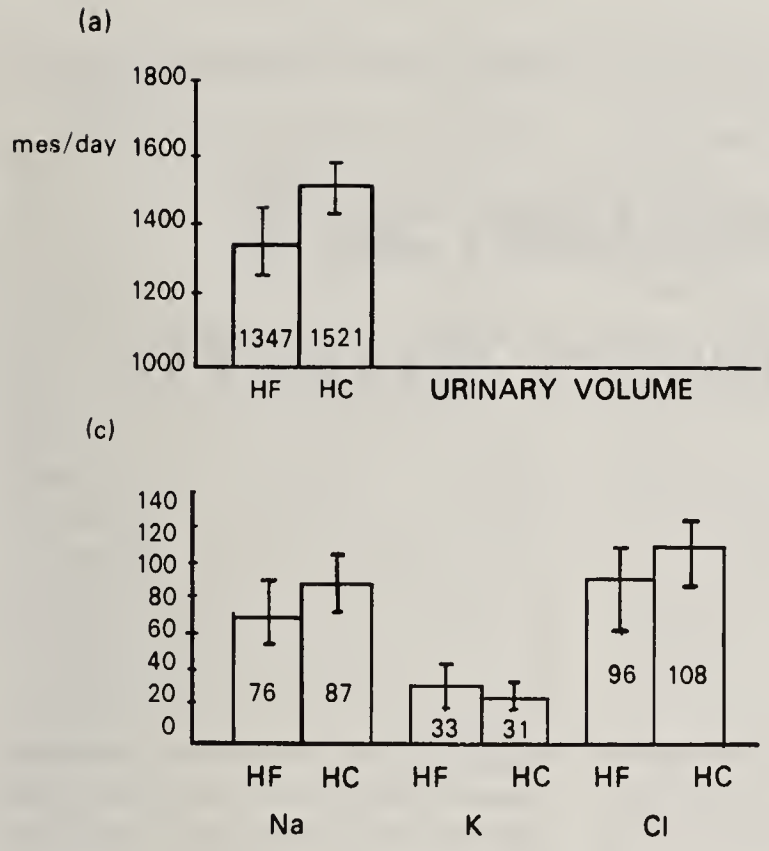

Fig. 1: Urinary Excretion (24 hrs.)

a) Urinary volume: No significant difference between HF and HC.
b) Urinary Creatinine and Urinary Nitrogen: No significant difference between HF and HC.
c) Urinary Electrolytes: No significant difference between HF and HC.
Note: HF - high fat, HC - high carbohydrate.

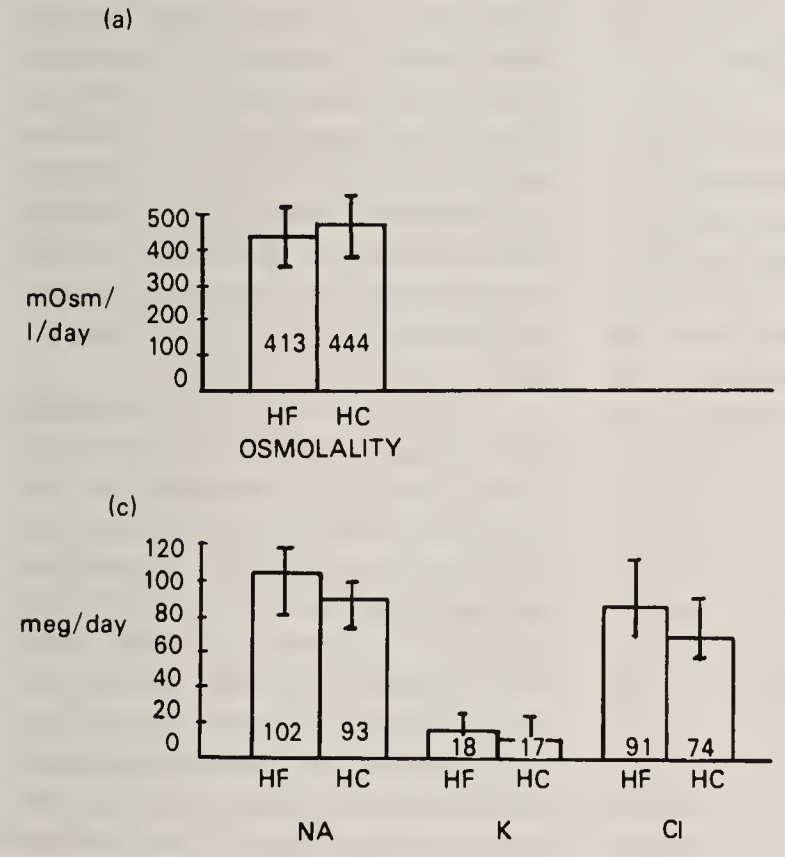

Fig. 2: Fecal Excretion (24 hrs.)

a) Fecal Osmolality: No significant difference between HF and HC.
b) Stool Weight and Stool Fat: No significant difference in stool weight between HF and HC. There was a significant (p 0.01) difference in fat content between the two diets, however, absorbed fat as a percentage of fat intake was not significantly different.
c) Fecal Electrolytes: No significant difference between HF and HC.
Note: HF - high fat, HC - high carbohydrate.

(Absorbed calories/Dietary Calories)

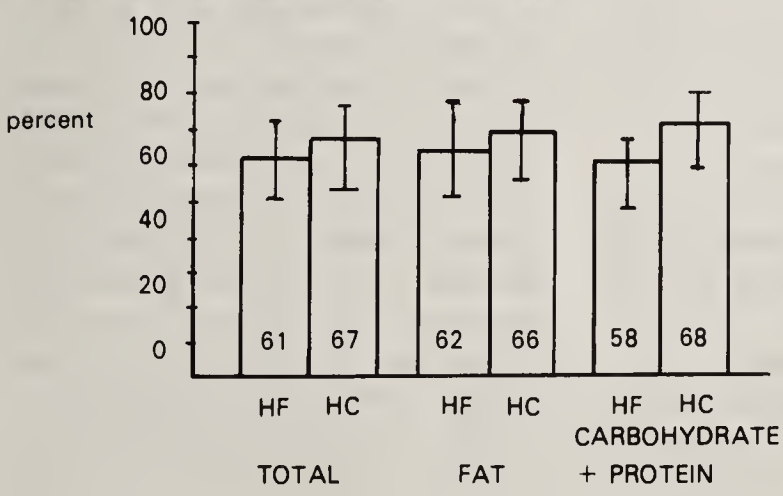

Fig. 3: Calorie Balance

There was no significant difference in mean total calorie, fat calorie, and carbohydrate plus protein calorie absorbtion between the HF and HC diets. It is of interest that the mean absorbtion of fat and non-fat calories was very similar, averaging about 65% of intake.
Note: HF - High fat, HC - high carbohydrate.

The Luque Instrumentation and The Evolution of Scoliosis Surgery

Michael Dan 8T4

The history of modern scoliosis surgery from its beginnings around the turn of the century to the present has been briefly reviewed. The gradual, almost incremental refinement in orthopedic technique is discussed; and it was concluded that in view of the varied clinical background of scoliosis patients, no single definitive operation for scoliosis exists, nor is it ever likely to exist. A recently devised operation, termed the 'Luque Segmental Spinal Instrumentation' was presented, and its value in the surgical management of progressive paralytic curves discussed.

Scoliosis is a term used by orthopedic surgeons to describe a lateral curvature of the spine. It is more of a deformity than a disease, however, when severe it can lead to serious impairment of pulmonary and cardiovascular function. It is also a cosmetic problem.

Fundamental to the surgical treatment of scoliosis is the application of both longitudinal and lateral corrective forces. Longitudinal forces may be either distractive or compressive. Lateral compressive forces are necessary because in order to correct a lateral curvature of the spine, a lateral force must be applied. This is graphically demonstrated by the international symbol for orthopedic surgery, which was devised in 1741 by Nicolas Andry, the father of orthopedics: it shows a crooked tree lashed to a pole by some rope.

Now that the biomechanics of scoliosis have been cursorily explained, the next step is to find a means of applying them to the crooked spine. Unfortunately, this is not an easy task. Scoliosis patients make up a clinically very heterogenous group. By this I mean that the pathological mechanisms underlying one patient's scoliosis may be very different from those of another's, despite the similarity in outward appearance between the two. For example, a patient with cerebral palsy may have a scoliosis due to powerful spastic contractions of her para-spinal muscles, (a paralytic curve) whereas a perfectly healthy fourteen-year-old girl might have a scoliosis for no apparent reason (an idiopathic curve). Both can be treated surgically. The fact that a dozen different operations exist for the same underlying condition means that all of them must work, albeit not as well as they should, or ought to. The sixty-four dollar question is: 'will there ever be a single, all-encompassing operation that works for all types of scoliosis?' The answer to this, although based on an evolving clinical impression of scoliosis, deserves to be put first into the correct historical perspective.

Historical Background

In the surgical management of scoliosis, the great conceptual breakthroughs were made at the beginning of this century, with the introduction in 1911 of the technique of bony fusion by Hibbs[9] and internal fixation by Lange[12]. From this starting point, a series of surgical and technical modifications have been made, each more successful than its predecessor. The Luque Segmental Spinal Instrumentation[3, 14], introduced in 1976, represents the most recent link in a chain of ideas that began with a paper entitled "Support for the Spondylitic Spine by Means of Buried Steel Bars, Attached to the Vertebrae."

In 1910 Fritz Lange presented the above paper to the twenty-fourth annual meeting of the American Orthopedic Association. In it he described a method of splinting the spine in a patient with Pott's disease (tuberculous osteomyelitis of the spine) by means of two subcutaneous steel rods, attached to the spinal column by silk sutures. Two years after the operation the patient was without pain, and continued to work in his father's blacksmith shop.

The following year (1911), Russell Hibbs of New York's Orthopedic Hospital and Dispensary published in the New York Medical Journal a preliminary report detailing his first three cases of spinal fusion, again, for Pott's disease. In 1914 he adapted the technique for scoliosis, and then refined it in 1917[10]. It is still used today, virtually unchanged, and forms the basis for a variety of modern methods of spinal

fusion.[11].

We have, therefore, the beginnings of modern spine surgery by the year 1911. Because of problems with infection and foreign body rejection, Lange's method fell into disuse, only to be born again in the late 1950's by Paul Harrington. Hibb's fusion, on the other hand, continued to be practiced. Gradually, orthopedic surgeons developed ways of adding correction to stabilization of the scoliotic spine. The history of scoliosis surgery is thus a follows: (1) fusion alone (1911-1924); (2) fusion with fixation by external means (1924-1962); (3) fusion with fixation by internal means (1962 to present).

Prior to 1924, orthopedic surgeons were unable to obtain a significant amount of correction before performing the fusion operation. Various plaster beds and traction devices existed, most notable of which was the Abbott body cast, however, results were often disappointing. Most failures in this era were due to failures of fusion, and to this day fusion is considered to be the cornerstone of any successful operation for scoliosis.

In 1924 Lovett and Brewster[13] of Boston introduced a method of external fixation that would have made the Grand Inquisitor blush. They called it the Turnbuckle Cast. After casting the patient from axilla to ankle, a horizontal cut was made over the apex of the curve, and a hinge placed on the convex side of the cast. By means of a turnbuckle screw on the concave side, the cast could be opened up like a book. The patient would wear it for as long as was necessary to achieve correction, sometimes for years. At operation a large window was cut over the proposed site of fusion, and a bony fusion performed. Postoperatively the patient would remain in the cast for up to a year, while the fusion mass healed. During the entire procedure he would be unable to walk. The method has been in use as recently as the late 1960's.

In the 1940's Risser developed the Localizer Cast, which made use of a special frame to apply the necessary corrective forces while the cast was being applied. Its saving grace was that it permitted ambulation.

In 1958 Blount and Schmidt[2] introduced the still popular Milwaukee Brace. Originally designed as an operative immobilization and correction device, it later found widespread use in the non-surgical correction of mild idiopathic curves measuring less than 40 degrees.

Despite the new developments in corrective casting, orthopedic surgeons continued to tinker with the idea of internal fixation. In 1955, Allan[1] gave an old idea a new twist, and devised a turnbuckle strut which when placed between two transverse processes, afforded a moderate degree of internal fixation. Most orthopedic surgeons were lukewarm towards the device, mainly because it failed so frequently.

Then in 1962 Paul Harrington[8] published a landmark paper in the Journal of Bone and Joint Surgery in which he described a system of posterior compression and distraction rods which for the first time afforded the scoliosis surgeon a significant amount of internal fixation. Although scorned for several years, the Harrington Instrumentation, when combined with an appropriate fusion, has proven itself ideal for the moderate idiopathic scoliotic curve. There are, however, a few drawbacks: (1) a body cast is still required postoperatively to prevent pseudarthrosis formation; (2) the method does not produce a significant amount of derotation; (3) it achieves poor correction of the more severe scoliotic curves.

As a means of overcoming these problems, and as an alternative to the posterior approach, a method of anterior instrumentation was devised by Dwyer[6] in 1969. The technique makes use of the fact that a taught cable will assume a linear configuration; thus, by stapling a titanium wire to the convex side of the affected vertebral

FIG. 1 Exposure of posterior vertebral elements. Note that the spinous processes have been removed.

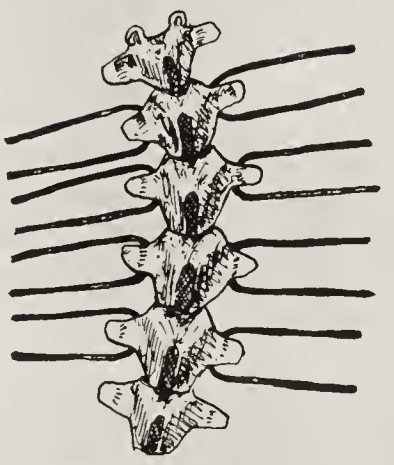

FIG. 2: Luque wires in place under transverse processes.

FIG. 3: Luque rods wired to vertebrae.

bodies (after the intervertebral discs have been removed), compressive correction can be achieved. On its own the method is useful in the moderately severe curve; in combination with the Harrington Instrumentation in a two-stage operative procedure, correction of even more severe curves can be achieved.

The Luque Instrumentation

What is lacking, however, is a method of one-stage stabilization of the very severe paralytic curves found in patients with cerebral palsy and meningomyelocele. It now appears that the Luque Segmental Spinal Instrumentation is best suited for this purpose.

(continued on page 111)

Non - Union Fractures:

A New Approach to Treatment

George Vincent 8T3

The use of pulsed electromagnetic fields in the treatment of non-union fractures has been reported effective in over 80% of cases in different clinical trials. The procedure is non-invasive, effective in actively draining infected fractures, and free of tissue electrolysis; thus it is presently the treatment of choice for surgically resistant non-union fractures.

Refractory to most forms of available treatment, non-union fractures have historically been a major dilemma in orthopaedics. No one method has been conclusively proven effective in their management. In some cases, amputation of the affected limb has been ultimately resorted to.

In 1955, researchers in Japan discovered that low-voltage constant direct current stimulated callus formation.[7] This discovery eventually led to the use of constant direct current in the treatment of non union fractures in humans in 1971[5]. This was, however, not the first time that electricity had been used to treat non-union fractures. An article published in 1845 gave an account of a patient being treated by electricity for a non-union fracture of the tibia in 1812. Within six weeks of treatment, the patient was able to walk out of the hospital, cured[6].

For the past ten years, constant direct current applied through multiple electrodes implanted into the non-union fracture site has been used extensively with a high rate of success; however, several disadvantages (the risk of infection, the possible displacement or breakage of electrodes, and the effects of electrolysis on tissue) have precluded its universal acceptance.

Pulsed Electromagnetic Fields

A great deal of interest recently has centered around the use of electromagnetic fields as a means of treatment.[1,3,4] The rationale for its use relies on a fundamental law of physics which states that a voltage can be induced in a conductive material if that material is placed in an alternating electromagnetic field. This principle is utilized to induce a voltage drop in bone, which in turn, is capable of stimulating osteoblastic activity. Bassett, in 1974, working with dogs in which bilateral fibular osteotomies had been performed, showed that a fracture subjected to an electromagnetic field healed more quickly and resisted deformation to a significantly greater extent than its control[2]. These results showed that electromagnetic fields influenced fracture repair.

Clinical Trials

If pulsed electromagnetic fields influenced the behaviour of osteoblastic cells in a normal healing process, then theoretically, they should also be effective in the treatment of slow-healing fractures. This was also studied by Bassett, who in 1977 was the first to report the use of electromagnetic fields to heal resistant ununited fractures in humans. The procedure was basically simple: The non-union limb was immobilized in a cast onto which an electromagnetic coil directly over the area of non-union. This was firmly attached (powered by a 110V line-operated wave generator). The treatment was conducted by the patients at home for a period of 12 to 16 hours per day for 3 to 6 months. Radiographs were taken monthly to assess the progress of treatment. With 43 patients, most of whom were candidates for amputation, Bassett was able to achieve union in greater than 70%[3].

The most extensive investigation to date has just recently been completed by Bassett on 125 patients with a total of 127 non-union fractures of the tibia. The average pretreatment duration of disability in this group was 36 months, with an average of 2.4 failed surgical procedures. Thirty-nine percent of the patients had a history of infection in the fracture site. Each patient was fitted with a pair of coils which were attached onto the cast at 180^0 to one another, directly over the area of non-union (see figure 1). Both the coil size and the generator voltage was determined for each patient according to the diameter of the cast at the point of non-union, ensuring the presence of an induced voltage in the therapeutic range. Radiographs were then taken to confirm the alignment of the coils with the fracture site. The coils were driven by a portable pulse generator

which operated for 10 hours per day for over 3 months. Radiographs taken every 4 to 6 weeks assessed the rate of healing.

As with healing by rigid internal fixation, little external callus was formed with the pulsed electromagnetic fields; thus, the level of fracture repair could not be determined by the extent of callus formation. Instead, Bassett used a method based on the appearance of the fracture gap and the surrounding bone. With this method, 4 stages of fracture healing could be radiologically determined.

Stage 1, consisted of an increase in radiographic density (fuzziness) in the fracture gap along with a patchy loss of density in the sclerotic bone around the fracture gap; this stage was normally reached from 1 to 3 months after start of treatment. In Stage 2, formed bone containing stress lines bridged the fracture gap in at least 3 distinct regions. For Stage 3, a radiolucent gap was evident in the medullary canal across the fracture site. Stage 4 simply described further remodelling at the fracture site; this stage can proceed for 2 years at which point the fracture would be completly healed.

Once a patient had achieved Stage 1 healing, he was refitted with a smaller cast, the coils were reattached, and a physiotherapy program was instituted. The patient was instructed to strike the heel of the affected leg onto a bathroom scale up to a predetermined weight 50 consecutive times, 3 times per day. The mechanical compressive force so produced had been shown to generate an endogenous voltage in the bone through a piezoelectric effect; this, in turn, served to enhance the induced voltages generated by the electromagnetic field and maximize the healing process. These exercises were continued until Stage 2 healing was reached, at which point the electromagnetic coils were removed. Once Stage 3 was reached, the cast was removed and the fracture was considered clinically healed.

Of the 127 non-union fractures treated, 109 (86%) achieved union. Figure 2 shows radiographs of a representative case. In a subset of the total group studied, patients had a pre-treatment disability of 7 1/2 years, and most had an actively infected wound at the time of treatment. All were deemed by surgical assessment to have an almost non-existent chance of spontaneous recovery. What is remarkable is that 82% went on to successful union of their fracture after this treatment.[1]

Other studies have recently appeared which support these results. W. DeHaas, from Calgary, has reported an 88% success rate in a trial of 17 patients with tibial non-union fractures.[4]

Conclusion

Pulsed electromagnetic fields have been shown to be extremely effective in the management of non-union fractures. This non-invasive treatment, effective in cases of actively infected fractures and free of tissue electrolysis, should be considered the treatment of choice for non-union fractures resistant to surgery.□

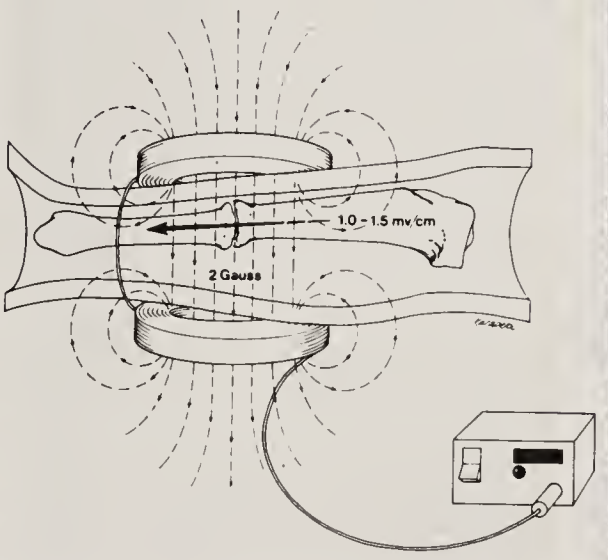

FIGURE 1: Diagrammatic representation of the apparatus used in the treatment of non-union fractures of the tibia. The pulse generator powers two electromagnetic coils which are positioned over the non-union site at 180° to one another. The pulsed electromagnetic field so produced induces a potential difference of 1.0-15 mv/cm in the tibia which is sufficient to stimulate fracture healing. (From Bassett, C.A.L., *et al.: J. Bone Joint Surg.*, 63-A:511-523,1981. Reprinted with permission.)

Acknowledgement

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FIGURE 2: Radiographs of a forty-five year old woman with a two year history of a non-union fracture of the distal tibia. A. Pretreatment radiograph. B. Radiograph taken thirteen months after start of treatment with pulsed electromagnetic fields. Note the disappearance of the fracture gap and the decrease in density at the site of the previous fracture ends--evidence of complete bone healing.
(From Bassett, C.A.L., *et al.: J. Bone Joint Surg.*, 63-A:511-523,1981. Reprinted with permission.)

Trends in Burn Therapy

Richard Korentager 8T3

More than any other traumatic injury, the extensive cutaneous burn can have a tragic and devastating effect. Only in recent years has burn therapy followed a systematic and scientific approach. The currently accepted treatment modalities will be discussed, including newer concepts of early burn wound excision and more recent developments in artificial skin substitutes.

The catastrophe of serious burn befalls more than 200,000 Americans every year; more than 12,000 of these people die.[9] On a per capita basis, Canadians experience this tragedy only slightly less frequently than do our American counterparts. These serious burn injuries involve not only cutaneous injuries but also cause widespread systemic problems. These problems can run the full gamut of renal, cardiovascular, metabolic, respiratory, infective and psychological inbalances. In addition, the patient with an initially acceptable cosmetic result, can end up with a mass of hypertrophic scars and contracture deformities (fig. 1).

The serious consequences of burn injuries have been recognized for centuries. As a result, a plethora of treatments have been proposed, adopted, discarded, and in some cases re-introduced. The controversy is far from over; however there is general agreement about certain areas of burn therapy.

Assessment

When the burn patient is frist seen, one must initially overlook the actual burn injury and look for cardiovascular, respiratory and neurologic emergencies. These injuries must always take precedence over cutaneous burns. Once any immediately life threatening injuries are treated, the body surface area (BSA) involved and depth of the burn must be estimated. The BSA can be estimated using the rule of nine's, remembering that the proportions in children vary from adults, with the head proportionately larger and lower limbs smaller. In adults, each arm, the head and the anterior and posterior leg represent nine percent each. Each of the anterior and posterior trunk are eighteen percent. Estimating the depth of the burn is essential as this gives one an idea of the likelihood of spontaneous epidermal regeneration. In a first degree burn, where there are surviving basal epidermal cells, or a superficial second degree burn, where there are many surviving skin appendages, the wound should heal completely without intervention. Deeper burns, either deep second degree, where there are few skin appendages left, or third degree, where even the deepest skin appendages have been destroyed, will heal very poorly and slowly or not at all.[9]

Resuscitation

With accurate assessment of depth and extent of the burn injury, vigorous fluid resuscitation can be instituted. Fluid resuscitation is necessary since the burn injury causes a dramatic increase in capillary permeability to any molecule of GMW less than 125,000, causing a rapid loss of fluid, electrolyte and albumin from the intravascular space. This increased permeability is generalized over the entire vascular tree in any burn greater than 30% BSA and massive edema can result (Fig. 2)[13]. To treat the resulting intravascular hypovolemia, the physician should immediately administer intravenous fluids. A popular formula for the estimation of the fluid requirement was proposed by Baxter. It involves giving 4cc/kg/% burn of Ringers lactate; half the volume is given in the first eight hours post burn and the rest over the next sixteen hours[1]. Since this is just an estimate of fluid requirement, the patient must be monitored carefully.

Clinically, heart rate, blood pressure, urine volume, temperature, capillary filling of a digit and mental status are all useful signs of over or under-hydration.[9] Colloid, in the form of fresh, frozen plasma, can be given after about eight hours post burn with no increase in the early burn edema. Capillary integrity is usually fully restored after about twenty-four hours, but there is still greatly increased evaporative water loss from the burned skin. The fluid

replacement is generally continued with five percent dextrose and water intravenously. If normal bowel sounds have resumed (burns greater than 20% BSA are frequently complicated by an initial gastric dilatation and reflex paralytic ileus which may last for twelve to twenty-four hours post-burn) oral fluids can be started.[13] The goal is to maintain serum sodium within the normal range. By the second twenty-four hours serum sodium and hematocrit can be used to accurately reflect hydration status.[13]

Accumulation of edema fluid under the inelastic eschar (the thick, coagulated slough that develops following a burn) of any deep second or third degree circumferential burn can have disasterous consequences. The resultant increased interstitial pressure can cause a compression syndrome of an extremity or the thorax resulting in nerve injury, muscle necrosis or respiratory embarassment. The loss of peripheral pulses is a late sign and one must watch for paresthesia or pain on passive movement so that an escharotomy can be done before permanent damage ensues. This procedure usually requires no anesthetic but should be performed in the operating room as there is risk of significant hemorrhage. The escharotomy involves incising the skin and then cutting all the way through subcutaneous fat to achieve release of pressure. In extreme cases a fasciotomy must be carried out (fig. 3)[9,11].

Hypermetabolism

Several days after a major burn, a hypermetabolic response is initiated that maximizes in four days and can erode body mass faster than any other disease process. The metabolic rate is linearly related to the surface area burned and reaches a maximum in patients who have sustained burns of greater than fifty percent of BSA. This response is a result of the anabolic healing process and increased catecholamines and glucagon and decreased insulin. The patient will remain in a negative nitrogen balance until; the burn wound is completely healed[17]. An estimate of the patient's daily caloric requirements can be made using the formula of Curreri *et al:* daily caloric requirement = 25 x wt in kg + 40 x BSA burned. A calorie to nitrogen ratio of about 150:1 has been found to be appropriate.[7] Hyperalimentation is usually necessary and this should be accomplished by the enteral route rather than parenterally due to the significantly increased risk of infection to the patient being maintained on total parenteral nutrition.

Infection

With the advent of effective resuscitative techniques, burn wound sepsis has become the most serious complication of a major burn. After a burn, all of the host defenses are impaired; there is an absolute and relative decrease in PMN's, lymphocytes, RES, complement and immunoglobulins. In this vulnerable state, the use of effective antibiotic therapy is essential.

The burn is usually sterile initially and is colonized with gram positive staphylococci from the surviving skin appendages within the first few days. By the fourth day, gram negative organisms, especially P. aeruginosa, predominate.[13] The avascular burn eschar not only acts as an excellent culture medium, but also effectively bars the entry of systemically administered antibiotics to the wound site. Unless the bacterial count of a wound biopsy is greater than 10^5/gm tissue (the number associated with bacterial invasion of local lymphatics and capillaries) or the patient shows signs of sepsis, systemic antibiotics serve only to favour the emergence of resistant organisms.[13]

Therefore, the cornerstone of infection prevention has by necessity become the topical antibiotic. These agents do not sterilize the wound; the goal of therapy is to keep the bacterial population below 10^5/gm tissue.

There are many topical antibiotics but none is ideal. Of the agents available, silver sulfadiazine has achieved the most widespread acceptance. It is a thick cream that is applied as a 2-3 mm layer to the burn eschar twice a day. The cream is washed off by immersing the patient in a water bath before being reapplied and the wound can be left open. Sulfamylon is another topical antibiotic and its spectrum of activity and penetrance of the eschar is superior to silver sulfadiazine but it also has more toxic effects. It may be useful in burns where the eschar is very thick, the ears are badly burned or there is an electrical burn.[8,10].

Silver nitrate was one of the early broad spectrum topical antibiotics used and is enjoying a return to favour in some centers. Although it does have nursing as well as medical disadvantages, it can be used to cover schar, excised wounds, grafted areas and donor sites unlike many other topical antibiotics. Since it does not need to be washed off, the daily bathing of the patient, a possible source of infection, is eliminated.

Since these agents do not sterilize the wound, one must also continually remove necrotic material to try to decrease the bacterial load. The threat of overwhelming sepsis is present until the wound is completely closed but the use of topical antibiotics has significantly reduced the mortality and morbidity of major burns.[8]

Inhalation Injury

Inhalation injury associated with a major burn can raise mortality rates to a frightening 48-86%.[14] The pathology of the injury can range from mucosal erythema, to ulceration and hamorrhage of the respiratory tree immediately following the injury to hyaline membrane formation and gram negative bronchial pneumonia several days after the burn. A high index of suspicion is necessary to diagnose inhalation injuries since there may be few respiratory findings for up to 48 hours.[14] The physician must look for evidence of

burns around the nose or mouth, carbonaceous material in the nasopharynx or a history of the patient being trapped in a closed space inhaling the products of combustion.[13] After the early problem-free interval the patient may follow a rapid downward course that requires mechanical ventilation and vigorous treatment. The mainstay of treatment is oxygen therapy and positive end expiratory pressure to prevent alveolar collapse. Treatment is instituted when the PaO_2 falls below 60 mmHg. The patient with carbon monoxide poisoning from a fire is in desperate need of vigorous oxygen therapy. Fluids must also be restricted in the patient with an inhalation injury since there tends to be edema of the lung parenchyma and larynx. This danger is so great that some advocate the prophylactic intubation of all patients with burns greater than sixty percent BSA[9]. The actual amount of fluid to be given is controversial but at the Toronto General Hospital, fluids are controlled to try to keep hourly urine output at 0.5 ml/kg body weight[14].

G.I. Complications

A potentially fatal complication of a severe burn is the appearance of stress or Curling ulcers. These are acute gastrointestinal erosions seen in many of the burn patients who have received no prophylactic GI protection. They will often appear within as little as ninty-six x hours time and can be seen on endoscopy to be sharply demarcated mucosal lesions. They are typically found in the fundal region of the stomach with antral and duodenal ulcers less common.[7] The incidence of ulceration increases with the BSA burned and episodes of sepsis. With burns of 70-90% BSA, 60% of patients with ulcers will clinically manifest themselves through hemorrhage, most often one to two weeks postburn. The patient is at risk of developing these GI complications until his/her wound has completely closed. The use of cimetidine intravenously or antacids by nasogastric tube and the re-establishment of oral feedings as early as possible has drastically reduced the incidence of Curling ulcers and their complications.[7]

Physiotherapy

Contracture and flexion deformities can have a lasting and devastating effect on the burn victim. (fig. 1) The burned part of the body will often assume a flexed "comfortable" posture and proceed to hypertrophic scarring and contracture. This may be due to the action of myofibroblasts or the result of physical buckling of the newly formed collagen and an intercellular glue.[3] Whatever the mechanism, early aggressive physiotherapy is essential. Splinting of limbs, proper exercise and the use of elastic stocking material before signs of deformity are present can reduce or prevent the occurence of deformities.[13].

Wound Closure

The main cause of morbidity and mortality in the patient with a large burn wound is not the destroyed skin, but the metabolic and bacterial consequences of having a large open wound for a long time. Also, the longer one waits to definitively close the wound the greater the chance that there will be significant hypertrophic scarring and contracture.[13] It is, therefore, obvious that the prompt and if possible definitive closure of the wound is most desirable.

To achieve early closure one must also practice early excision of the eschar. Early excision is generally performed only with burn wounds that would take greater than three weeks to heal if treated conservatively. Conservative treatment consists of using topical antibiotics while allowing the eschar to seperate from viable tissue spontaneously. Early excision of a third degree burn can be accomplished by excising directly down to fascia or by "sequentially" excising down to viable subcutaneous fat. Early excision in a deep second degree burn is usually accomplished by tangential excision down to viable dermis.[6] A freehand knife with a guide is used to sequentially shave off layers of skin until the viable tissue is reached. (fig. 5) All non-viable tissue must be removed or attempts at skin grafting will fail. Viable tissue can be distinguished from non-viable by its pinkish colour and punctate bleeding. In both techniques meticulous hemostasis is required or the skin autograft won't take[6]. Currently the use of biological or chemical systems to separate viable and non-viable tissue is being explored. These methods hold great promise but are not as yet at a clinically acceptable stage.[5]

To be effective, early excision should be carried out as soon as possible, normally four to seven days post-burn (in some centers it is done as early as ten hours). It is not an easy course to follow. The patient loses significant amounts of blood during the procedure and the anesthetist is faced with a very ill patient. Therefore, to be able to excise a large amount of eschar quickly enough, a team of surgeons is required. This way, the blood loss and anesthetic time are decreased.

The main problem facing the exponents of early excision and closure of the burn wound is finding enough autograft to close the wound. For wounds less than twenty percent BSA there are ample donor sites available, while for wounds between twenty and forty percent BSA all donor sites must be harvested, including unusual donor sites such as the scalp and feet.[6] The split skin grafts that are taken can either be placed directly on the wound bed or can be meshed. A meshed skin graft has many slits put in it so it can be expanded up to about six times its original size. This is not an ideal system, but does allow prompt closure of large wounds that otherwise couldn't be closed immediately. (fig. 6) Since it takes about twelve days for a donor site to be ready for reharvesting, it is essential that the skin grafts receive optimal care so that as close as possible to one hundred percent graft take is achieved.[5]

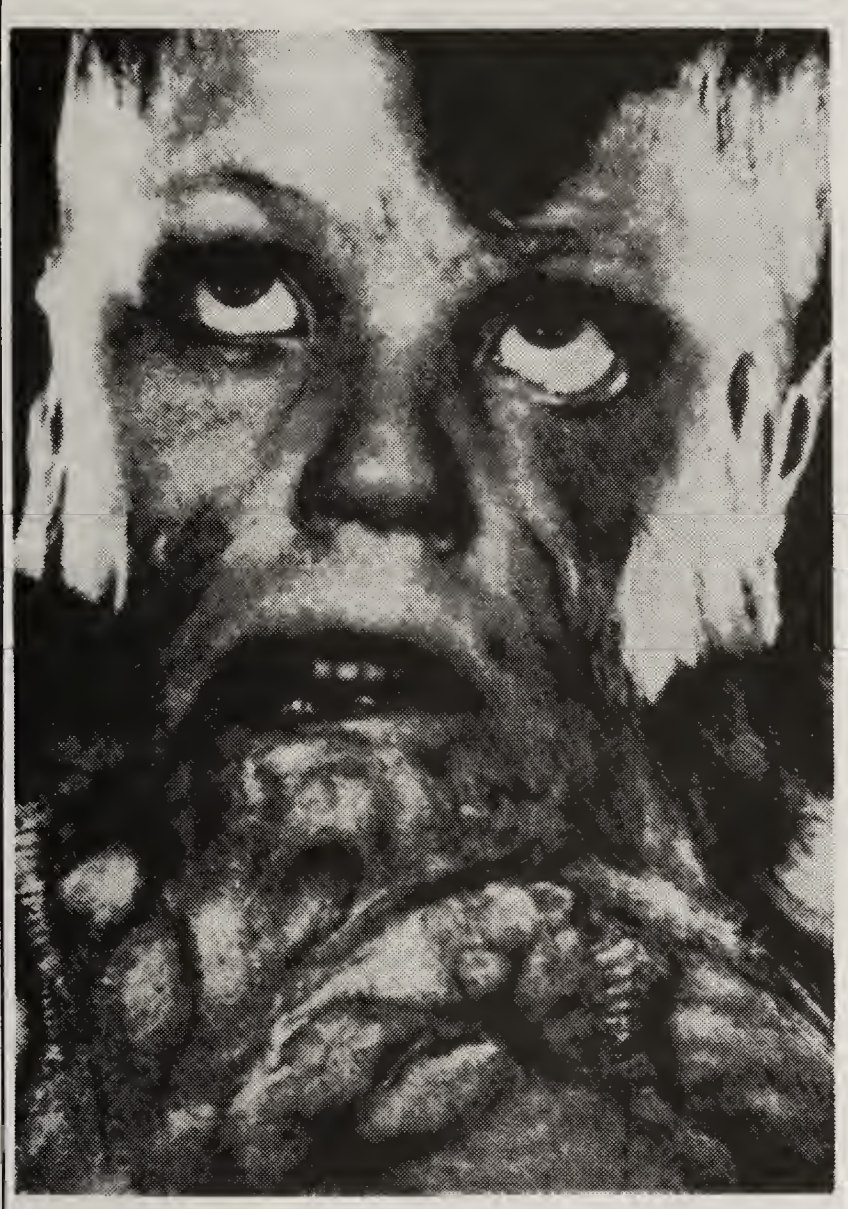

Fig. 1 - Hypertrophic scar and contracture deformities.

Fig. 2 - Massive facial burn edema.

What about the patient with a burn of greater than 40% BSA? There is obviously too little autograft to completely close their wounds yet their chances of survival if their wounds aren't closed by three weeks is decreased.[5] There are two possible solutions. Either a temporary covering for the wound, or a permanent artificial skin may be employed. Until very recently only temporary coverings had been used with any success but now a type of artificial skin is showing promise.

The temporary dressings can be divided into biological and artificial substances. The biological dressings that are currently used are homografts, heterografts and amniotic membranes. All three act to reduce bacterial growth in the burn wound, decrease evaporative water loss and metabolic requirements of the patient, promote wound healing and they may even reduce post-burn contracture and scarring. However, the biological dressings become neovascularized and even with their compromised immune system, the burn patient rejects the foreign tissue within one to three weeks. Cadaver homografts have the longest biological lifetime followed by heterograft (pig skin). Amnion, although effective, is very difficult to handle and remove and is thus less acceptable. These dressings can therefore be very beneficial if the burn wound can be closed from donor sites on the patient (reharvested) before this inflammatory rejection process occurs that will make the graft bed unsuitable for a graft.[12]

Dr. J.F. Burke *et al* at the Shriners Burns Institute in Boston developed an innovative strategy whereby the patient is administered the immunosuppressing drug azothioprine and the homografts are taken from the patient's relative who is closest to being HLA identical with the patient. Using this complicated method, homograft survival has been prolonged up to fifty-two days — enough time to fully autograft most massively burned patients.[4] Since infection is such a major problem in burn patients, episodes of sepsis must be watched for carefully and treated immediately.

The main disadvantages of these biological dressings are that they are very expensive (porcine skin costs at least sixty dollars per square foot) and can only be put on a bacteriologically clean granulating wound from which all the eschar has been removed.[12]

Many synthetic materials have been tested as dressing and most have been found to be sorely lacking especially with respect to controlling bacterial proliferation on the burn wound.[12] Recently though, a dressing called Biobrane® was introduced.

Biobrane® is a silicone rubber membrane with a flexible nylon fabric underneath and the whole unit has a hydrophilic biologic component bonded to it. The nylon side shows very good adherence to excised burn wounds and the Biobrane® decreases evaporative water loss, bacterial invasion and pain. The material is peeled from the wound when autografts are to be performed. It is presently being used in some centers for people with deep second and third degree burns but hasn't as yet received widespread acceptance.

Currently, a series of tests, both animal and laboratory, are being performed on inexpensive, water soluble materials by a group of researchers in Toronto. The materials being tested possess some unique and very promising properties. The water solubility of the compounds permits their removal completely atraumatically. This would be a boon to both the patient and nursing staff because the changing of burn dressings can be quite a difficult and painful affair. Preliminary results would seem to indicate that these dressings are capable of controlling bacterial proliferation and scar formation. As well, unlike other biologic and artificial burn dressings, they may be able to be placed on wounds not considered clean bacteriologically with significant beneficial effect.[15]

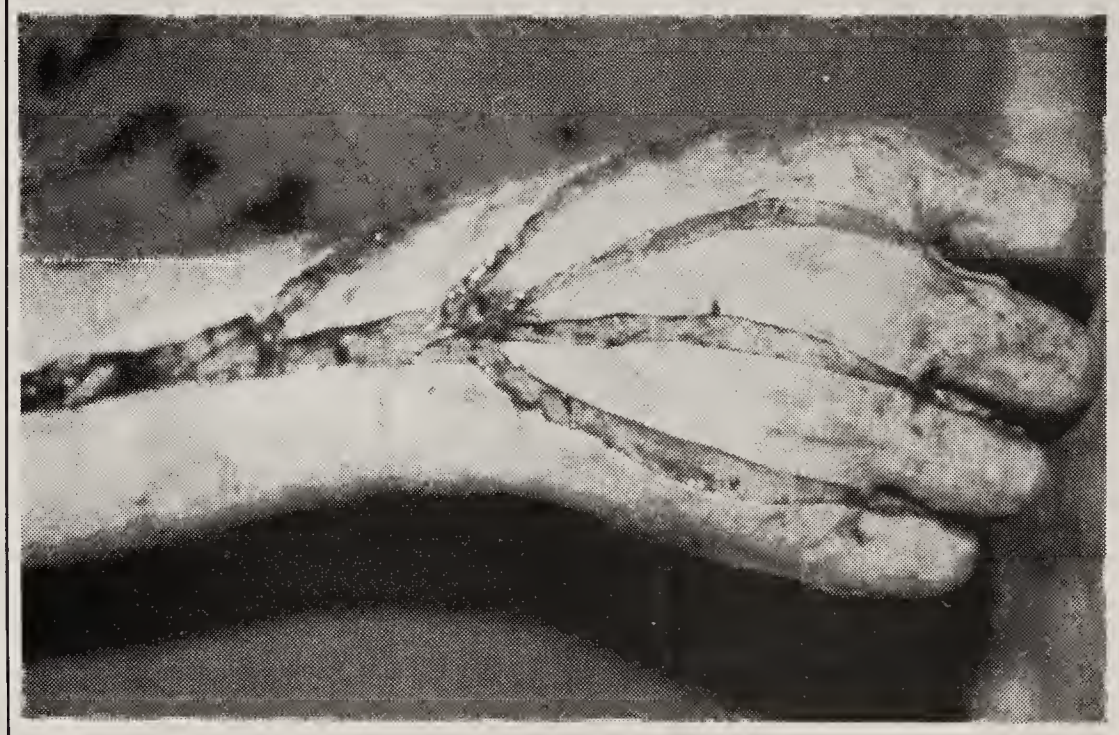

Fig. 3 Escharotomy of a forearm and hand with a circumferential third degree burn.

Fig. 4 - Splinting to prevent contracture deformities.

The new frontier now being opened up involves the development of true artificial skins. Researchers at Harvard and MIT have recognized that a minimum critical thickness of dermis is required in split-skin grafts to inhibit hypertrophic scar formation and contracture deformities. It was therefore postulated that the best covering for serious burn wounds that needed grafting would be an artificial skin that would possess a dermal and an epidermal portion and could become part of the patient.[18]

One very expensive and complicated design involves the use of biopsies of the patients own cells that are then grown up in a tissue culture. Utilizing the contractile properties of fibroblasts, a dermal equivalent is molded and then epidermal cells are spread on top. The results from their early animal experiments show that this skin substitute behaves very similarly to an autograft.[2]

Another type of artificial skin is a bilayer made up of a temporary silastic epidermis and a collagen chondroitin-6-sulfate fibrillar dermis. Control of pore size and density, cross link density and composition of the dermal portion determines how quickly the artificial dermis is vascularized, and later degraded and replaced by the patient's own cells. As soon as the membrane is in place, skin integrity is essentially restored and the burn patient's fluid and metabolic disturbances can be corrected much more quickly and easily. The speed of degradation is essential if fibrous scar formation is to be controlled. Once the dermal portion has been fully vascularized, the silicone outer layer can be removed and the new "dermis" can be skin grafted using a very thin epidermal graft.[18] This system allows the immediate closure of any size of excised burn wound and could therefore prevent most of the complications that arise in the seriously burned patient. Although it is only in the early stages of clinical trials it has already been

shown to be extremely effective and easy to work with.[18]

Team Approach

As can be seen from the preceding discussion, there is virtually no system of the body left unaffected by a serious cutaneous burn. It is logical then, that to adequately treat the burn patient, a multidisciplinary team of health care workers is required. The burn unit should be composed of people who can provide for the total care of the patient — from the initial emergency care and specialized surgical and nursing procedures, to the nutritional support, occupational therapy and psychiatric needs of the patient. With a group this large involved in the care of a single patient, communication between the health professionals is essential. In this way treatment plans can be individually tailored to fit each patient's needs.

Given the broad spectrum of expertise of a burn team, the road to recovery is far from smooth. Not only can the burn victim expect a long stay in hospital but the process whenever possible. A structive surgery can go on for years. The patient must therefore be included in the decision making process hwenever possible. A motivated patient with reasonable expectations and an understanding of what is being done, will receive the most benefit from his/her therapy and be able to rejoin society as a vital, functioning human being as early as possible.

Acknowledgement

I would like to thank Dr. G. Murray as well as everyone at the Toronto General Hospital burn unit. I would especially like to thank Dr. W. Peters for all the time, help and encouragement he gave me in the preparation of this paper. He has also generously provided me with the photographs.

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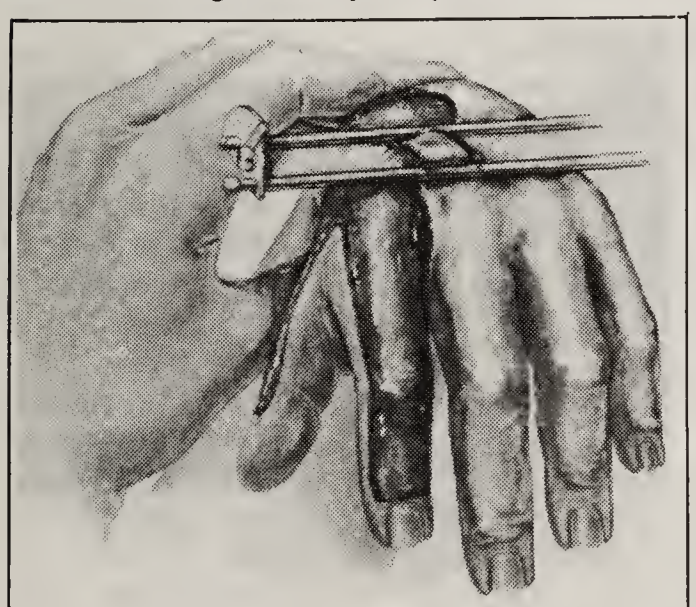

Fig. 5 - Tangential excision.

Fig. 6 - Mesh graft.

Intestinal Nematode Disorders

Douglas Kondziolka 8T5

With the advent of trans-world travel came the introduction of many tropical helminths into North American society. Necator americanus and Enterobius vermicularis each produce a different clinical situation. When found in tropical regions, these nematode disorders are often complicated by the presence of malnutrition and other bacterial or parasitic infections. Appendicitis, ulcers or other common intestinal problems may clinically resemble the parasitemia. However, for the physician, diagnosis and treatment is worm-specific.

HOOKWORM (UNCINARIASIS)

Necator americanus (tropical hookworm), along with its relative, *Ancylostoma duodenale* (European hookworm), are the causative agents of uncinariasis. Both are nematodes of the order Strongylata and are the most destructive of the human intestinal helminths.

Geographically, the two species have a worldwide distribution. In temperate climates, parasitemia has been successfully controlled but in more tropical regions, prevalence is still high.[9] A prevalence of 40 - 60% has been observed in Brazil while 95% of school girls in the Peruvian Amazon are infected.[12] In North America, the problem still exists in some of the southern United States. Puerto Rican citizens should not be overlooked as possible disseminators of the worm.

The two species can be distinguished morphologically. *A. duodenale* shows two pairs of chitinous teeth in the buccal cavity and a symmetrical, shallow ray pattern in its copulatory bursa. *N. americanus*, however, has cutting plates instead of teeth and a deeply cleft copulatory bursa. Thinly shelled, oval eggs appear similar for both species.

Uncinariasis is caused by the adult hookworm being firmly attached to the jejunal mucosa. Here it sucks blood to obtain necessary supplies of oxygen and glucose.[9] Blood volume within the worm may increase to the point where it is externally shot out the anus.

The infection is usually a chronic one; this best suits the parasite, who can often live for up to five years. Eggs are produced daily by the female, in numbers reaching 20,000 from *A. duodenale*.[10] The eggs are released externally with faeces and will start to develop should they reach a suitable soil location. Here they molt twice to an infective filariform larvae which feeds only on stored nutrients. Molting involves the shedding of an outer non-cellular cuticle to be replaced by an inner new cuticle. The outer cuticle is loosely retained for protection.

Upon recognition of heat and CO_2 stimuli, the larvae migrate to the soil surface to mechanically burrow into a new host. This is often the case when a person walks barefoot along a beach. Some successful larvae will then penetrate via the lymphatic circulation into the superior vena cava and later arrive at the pulmonary alveoli. Passage occurs through the alveolar septa into the air spaces. In time, the larvae will proceed into the bronchial tree to be coughed up and swallowed. Upon reaching the small intestine, the third molt allows the formation of a buccal capsule for instestinal attachment. A fourth molt produces the adult. One to two months will have elapsed between skin penetration and egg production.[9]

Pathology

Migration of the hookworm over such a large anatomical area correspondingly produces problems in many sites. At the point of entry, usually in plantar skin, is found a local pruritus accompanied by edema with outpouring of granular leukocytes. Entrapment within lymph nodes may produce a localized lymphadenities.

Penetration through alveolar septa may result in localized intra-alveolar hemorrhaging.[9] In cases of large parasitic invasion or secondary bacterial infection, bronchitis has been observed.[10]

Specific tissue manifestations occur in the intestinal mucosa. These may extend from small lesions to areas of necrosis resulting in fibrosis of the submucosa.[14] In most cases, the columnar epithelium and lamina

propria appear normal with a decrease in intracellular mucus. Most mucosal disruptions return to normal when the worm moves on or after treatment has been given.[8]

Corresponding to its mode of feeding is the presence of hookworm anemia (hypochromic, microcytic), which is heavily dependent on worm burden. In some cases, an elevated reticulocyte count is present with nucleated erythrocytes in the peripheral circulation. The anemia is essentially due to iron uptake by the worm as was shown by the rapid positive response to administration of iron salts[13] However, in the first world, body iron reserves are generally high enough so that this does not pose a problem.

Diagnosis and Treatment

Clinically, the diagnosis of a hookworm infection is made by counting eggs. A 2 mg fecal smear should show over 20 eggs to be considered a clinical infection.[9]

However, the symptomatology is not so precise. In tropical areas, the possibility of malnutrition and concurrent bacterial or parasitic infections must be taken into account.

In mild infections, the patient may remain asymptomatic or complain of intestinal pain especially in the epigastrium or right hypochondrium. In heavy infections, false diagnosis of abdominal or duodenal ulcer or appendicitis are not uncommon. As a result, exploratory surgery is often performed.[9]

Eosinophilia, sometimes reaching 90%, acute pain at the time of oviposition and cardiac palpitations are characteristic. Urine may contain albumin, erythrocytes and leukocytes.[9]

Classically, the chronic nature of the disease leaves the host in a state of lethargy. In endemic areas where infections of greater worm number are common, this has had a social effect on the population.

Mebendazole and pyrantel pamoate are the most widely used anti-helminths for Uncinariasis. Mebendazole (100 mg) is administered twice daily for three days. Pyrantel pamoate is given for a three day course for *N. americanus* while only a single dose is required for *A. duodenale*. Because the two species cannot be distinguished by just observing egg morphology, a three day course is given to ensure treatment of either *Necator* or *Ancylostoma*.

PINWORM (ENTEROBIASIS)

Enterobius vermicularis is a nematode belonging to the order Oxyurata. It too has attained cosmopolitan distribution, and is the causative agent of Enterobiasis. This disease is more common in children and tends to centralize in nurseries. Unclean conditions and dusty areas tend to enhance infection rates. As a result, transmission is largely familial or through groups of people living together. An American study has shown the incidence as being approximately 40% of children which indicates that Enterobiasis in some degree is fairly common[1].

E. vermicularis is an intestinal roundworm with man as its only known definitive host (although cases have been reported from chimpanzees)[7]. Its life cycle has no developmental period outside the host, nor does it require an intermediate host.[9]

When ova are ingested, they reach the duodenum and hatch. From here, three molting stages proceed to produce a sexually mature adult. Copulation then takes place in the proximal large intestine around the cecum and vermiform appendix. In most cases, the male soon dies after copulation. Gravid females then migrate to the rectum. Following a nocturnal rhythm, the female migrates through the external anal sphincter to lay its ova along the perianal folds. Usually the female dies soon after[9]. Occasionally, the female may migrate to the vagina or enter the urinary bladder which may cause inflammation and irritation.[10]

The female worm usually carries about 11,000 eggs, and can sometimes be felt as she crawls through the rectum. In classrooms, up to 300 eggs per square foot have been found lying in the dust[10].

The host-parasite relationship can be seen to thrive quite easily. Ova are released into the air (whether by a person's own gluteal movement or through shaking out infected linens), whereupon they usually land on dust particles. Here they can be easily ingested or inhaled to complete the transmission into another host. Without the complications of an intermediate host or a delicate life cycle, *E. vermicularis* can be seen as an efficient parasite.

Pathology

Pathologic changes in the host are limited to the gastro-intestinal tract, anal and perineal regions. Lesions of the G-I tract and mild inflammation are usually seen in the cecum, appendix and lower ileum, as adult development and sexual activity takes place here.[9] Ulceration of the mucosa has also been demonstrated. However, in most cases of intestinal ulceration and concurrent pinworm infection, the ulcer was coincidental.[2]

Parasitic invasion into the mucosa can produce an oxyuris nodule (chronic granulomatous lesion) within which there is an abundance of eosinophils. Apart from the intestines, these have been reported in the inguinal ligament, greater omentum, transverse mesocolon and in the pelvic peritoneum.[15]

In regions of mucosal lesion, secondary bacterial infections occasionally arise resulting in mucosal abcesses. Both infections lead to lymphoid hyperplasia which may wall off the invading parasite. Very rarely, secondary bacterial infection can also produce an ischiorectal abcess, requiring surgical treatment.

In cases of pinworm abundance, intestinal obstruction can occur, especially at the left colic flexure.[9] And as would be expected, a

bloody stool may be found.

The relationship of *E. vermicularis* to appendicitis is substantiated. The incidence of appendix invasion by pinworms is approximately 1.2 — 18.2%, this depending on worm burden.[1] These invasions can block the lumen of the appendix. As a result, *E vermicularis* has been found in cases presenting with clinically appearing acute appendicitis, in the absence of any inflammatory response. A histologic study of 691 appendices in children revealed pinworm in 52. Of these, 44 showed appendicitis while 8 showed only abscess formation.[4]

Invasion into the peritoneal cavity is almost always seen *only* in women. Migration occurs through the genital tract to the uterine tubes and infundibulum and into the peritoneal cavity.[15] Again, this problem is rare. Similar occurences in males are due to perforations in the intestinal wall.

Diagnosis and Treatment

Infections are diagnosed by locating the released ova. This can be easily done using a perianal swab or by applying Scotch tape to the anal folds. The tape or swab is then rubbed onto a microscope slide where some eggs will be seen if infection has occurred.

The ova measure 50-60 um in length, 20-30 um in width and 20 um in thickness.[15] When seen from above, one of the long sides is more curved than the other (figure 1). An ability to recognize the ova in different planes of view is important for an accurate diagnosis. The egg shell is in two layers, with an outer layer measuring 0.45 um and an inner one of 2-6 um.[6] Because of this shell, the ova are resistant to decay and disinfection for as long as thirteen days under moist conditions.[3]

Diagnosis can also be made by demonstrating the adult using enemas but this is rarely done, as the adults may be few in number.

Enterobiasis is asymptomatic in cases of slight infection. The most important clinical symptom is pruritus of the perianal skin, due to migration of gravid females. This may lead to nocturnal irritability and nervousness.[10] Symptoms referable to the GI tract are rarer and are usually abdominal pain and vomiting. However, nervous disorders (ie. convulsions) may occur if sympathetic nerve endings around the cecum are stimulated.[5] Nasal pruritus is seen when the adult female migrates up the esophagus to the nasopharynx[11].

Pyrantel pamoate (non-prescription) is an effective drug, administered in proportion to body weight. This may be impractical if large groups of people are to be treated. A single tablet ob mebendazole is pratical and effective, but one pays for prescription costs. It is of great importance that an anti-helminth be administered to all members of the patient's family or close-contact groups to prevent further infection.

In the past, doctors used to advise the wearing of underclothing to bed, changing bedsheets, maintaining short fingernails and hand washing to prevent infection. Currently, some of these cautions are being omitted for it seems that the psychological effects of being told to "clean up your act" may override any good achieved by these procedures.

Summary

A proper understanding of the life-cycle of each parasite helps to ensure proper prophylaxis and treatment. In some countries, the wearing of shoes has almost eliminated the presence of hookworm. As time continues, diseases never seen in this country are being diagnosed. Many of these are a direct result of increased travel between tropical and temperate climates. Correspondingly, the physician must increase his clinical repertoire.□

Acknowledgements

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FIG. 1. *E. Vermicularis* ovum (Blecka, L.J. Concise Medical parasitology Addison - Wesley, Don Mills. P.51, 1980)

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The Arts and Letters Creative Writing Contest enjoyed another successful season this year, with eight entries in the short story category, and twenty-three poems. The contest was judged by professor Frank Watt of the English Department, University College, and Irving Layton, the university's Writer-in-Residence. Prizes were donated by the Medical Alumni Association and the Medical Society. A special thank-you is extended to Dr. Gibbon of the Medical Alumni Association for his constant support throughout the year.

The winners in the prose category were:
First prize: "The Great Escape", by Paul Walden, 8T4
Second prize: "The Cleaning Lady", by John Young, 8T2
Third prize: "Willy's Game", by David Salamon, 8T5

The winners in the poetry category were:
First prize: "Science Fiction", by John Young, 8T2
Second prize: "i remember the bull calf", by Nigel Jagan, 8T3
Third prize: "The Show", by Jagpreet Arora, 8T5

We would also like to thank all those who took part in the contest.

David Malkin 8T4
Ilka Szachniewicz 8T4

The Great Escape

Freddie and Wilmar had the sort of friendship that one usually finds only between two strong men in a classical poem. Since day one at the University of California at San Diego they had been roommates sharing more than one common interest.

When Freddie, in his freshman year, had decided to work for the school newspaper it was Wilmar who would accompany his pal as he made the rounds from the Revelle College cafeteria to the university payroll office in order to round up all the important news. And when Wilmar decided to collect as many worms as he could for his Frontiers of Science project, Freddie was the first to volunteer to stay up all night with him and comb the brush behind the Central Library.

But to their friends the names of Freddy and Wilmar were synonomous with one thing: computers. It had been three years since Freddie had taken an introductory course and interested Wilmar in the fascinating world of programming. Scarcely a Friday night went by when you could walk by the ground floor of the Applied Physics and Math building and not see the two friends pouring over a computer printout.

As the months passed, the team of Freddie and Wilmar became known for their programming acheivements. In only a short time, they had not only mastered the intricacies of the entire computer system but had written a program which could print out all the numbers less than a thousand that were divisible by thirty, while it was playing tic-tac-toe. Not content to rest on their laurels, the friends were hard at work on a program to print a calendar of all the Thursdays for any year up to 1995.

Their friendship was, in a word, ideal. On the campus of the University of California at San Diego, one would rarely hear somebody talk about Freddie and Wilmar without mentioning Damon and Pythius in the same breath.

But you know how it is. One minute you're breezing along like nobody's business when in steps fate with the old banana peal under the foot. In this case, the fly, in what was otherwise smooth ointment, came in the shape of a cute brown-haired girl from South Carolina.

Cynthia was as cute a freshman as had ever thrown a frisbee across Revelle Plaza. She came complete with large brown eyes and a sizable amount of naturally curly hair. When she smiled it was a strong man who did not experience a sort of choking sensation. In short, she affected a feminine disposition that was conspicuously absent in most other female freshman.

It came as no surprise, then, that scarely three minutes after Cynthia had entered the keypunch room

looking for somebody to show her which way to insert her cards into the card reader, that Freddie was graciously demonstrating how to start the machine and Wilmar was standing at his side explaining how the end-of-file button worked.

Neither Freddie nor Wilmar had much experience with girls but they both knew a good thing when they saw it. Within a week, Wilmar has helped Cynthia punch up the cards for her first assignment, while Freddie had got into the habit of running the cards through the card reader and bringing the printout over to the table where she was working.

'You boys are just too kind,' Cynthia said to them. They had just finished her third assignment. She looked at them with her large brown eyes. 'You'all are just the nicest boys I've met in California. I don't know how I would have ever finished without your help.'

'Aw Cynthia, it was nothing,' said Freddie shuffling his feet.

'No trouble at all,' mumbled Wilmar blushing.

Life for Freddie and Wilmar was the Grade A luxury-value type of life. Each of them thought only of Cynthia. They lived for Tuesdays — the day the new assignment for the week was given out — when each would be able to help Cynthia.

Yes, thought Freddie, I'm in love. The real thing.

The only fly in the ointment was Wilmar.

How's a guy supposed to carry on a romance with some goof always hanging around? thought Freddie morosely.

Wilmar was also having his troubles. He too loved. In fact, he was sure that Cynthia had fallen in love with him. But how could she tell him when that drip Freddie wouldn't leave them alone for more than two minutes?

As if the situation wasn't thick enough, mysterious things began to happen; like the time that Wilmar ran one of his programs and found that all of the print statements were missing. And it wasn't long after that Freddie found that a subroutine that he had been using for several weeks suddenly wouldn't compile. Upon inspection he found that all the left parenthesis had vanished.

As the days passed the great Freddie-Wilmar friendship began to feel the strain. Freddie and Wilmar were barely talking.

It was only natural then, that as the month of April rolled around Freddie breathed a sign of relief. It was the third week in April when UCSD was the scene of the annual Fruit Ball where everybody came dressed as their favourite fruit. There was dancing all night, topped off by a large gathering in Revelle Plaza where hundreds of couples would sit bare-footed; holding hands and eating watermelon as they waited for the sun to rise.

Yes, once a year the USCD campus went wild, and Freddie was sure that if he could only get Cynthia alone long enough to invite her to the Fruit Ball his troubles would be over. What girl could resist the romance of Revelle Plaza at dawn? It was a sure thing. The only problem was how to get rid of Wilmar long enough to talk to Cynthia alone.

It was three days before fate presented an opportunity to Freddie. It was Tuesday and, as usual, he and Wilmar were helping Cynthia with her homework. Wilmar had just left to look for some pink computer cards, Cynthia's favourite color, when Freddie saw that this was his big chance.

He walked up to her. 'Oh, Cynthia.'

'Yes, Freddie?'

'Cynthia...I was wondering..that is...I mean to say...if you're not doing anything next week...you know...about the Fruit Ball and all that...and I was thinking that maybe if you had nothing else to do.... that you and I....'

He stopped. There at his side stood Wilmar, scowling.

'Boys,' said Cynthia, 'you'all are just too sweet. Why just this morning Wilmar asked me to go to the l'il old Fruit Ball with him. It's too bad though. I don't think I'll be able to go to the dance at all. There's that big assignment that's due next week, and I'm afraid that I'll be just too busy with it to consider going dancing.'

Freddie looked at Wilmar and glared. Wilmar glared back.

They had both forgotten. Cynthia's class had just been given a term project to be turned in the following week. They were supposed to write a program to print out all the possible five letter words that began with the letter 'Q'.

"And you know boys,' continued Cynthia, 'for an assignment this hard it would probably take all week to do.'

'But Cynthia,' said Freddie, 'what if someone were to help you and you finished the assignment early? You could go to the dance then, couldn't you?'

She thought it over. 'Well,' she said, 'in that case I guess I could go, but I don't see how--'

'Just a minute Cynthia,' interrupted Freddie. 'Wilmar, come on over here for a minute. I want to talk to you.' He motioned to the other side of the room. Wilmar followed him.

'Look Wilmar,' whispered Freddie, 'I guess you know by now that I'm in love with Cynthia. And what's more, she's in love with me.'

'Freddie,' said Wilmar, 'you've got it, except for one small detail. It's me that Cynthia is in love with, not you'.

'Wilmar, how you can think that a beautiful, charming girl like Cynthia could be in love with a pill like you is beyond human understanding. Be sensible. If you would only stop forcing your beastly presence on Cynthia and me, I could help her with her homework and easily be done in time for us to go the Fruit Ball.'

'You?' exclaimed Wilmar. 'Why you couldn't program your way out of a paper bag.'

Freddie held up his hand. 'Wilmar,' he said, I'm asking you to act like a gentleman and admit that you've drawn the short straw. It's obvious that Cynthia loves me.'

Wilmar made a face.

Freddie continued. 'However, if you can't find it in that cheap, imitation heart of yours to do the square thing then there is only one thing for us to do. We must have a contest.'

'What are you talking about?'

'Look, Cynthia has to finish her program by next week or she can't go to the Fruit Ball with anyone. Let's have a contest to see which one of us can complete the assignment first. Whoever wins gets to take Cynthia to the dance. What do you say?'

Wilmar thought it over. There were six days to the dance. It was a difficult assignment, but if he worked hard he could probably get it done in four or five days — even less if he worked nights.

'Okay', he said aloud, 'it's a deal.'

'Fine, let's go tell Cynthia.'

'How can I ever thank you boys,' said Cynthia, when they told her that they would see to it that her assignment was done on time. They had wisely decided not to tell her of their contest.

'You boys are so kind to li'l ole me. I don't know what I would ever do without you'.

Freddie walked way smiling to himself. Although Wilmar didn't know it, he had a secret weapon—Edsgar Dijkstra's new book 'Learn How to Write Perfect Programs by Looking at Pictures'. With a book like this up his sleeve, how could he lose?

The next three days were busy ones for both Freddie and Wilmar. Freddie had decided that the bold, brash technique was what was called for, and so he began by punching up a hundred cards right way, hoping that the program would work the first time. Wilmar's methods were quite the opposite. He set to work and carefully and methodically designed the necessary seventy-four subroutines before even punching a card.

It was on the fourth day of the contest, when Freddie was punching up some corrections in preparation for his sixty-third run, which he knew would work for sure this time, that he looked up from the keypunch and saw Wilmar standing quietly at his side. His fists were clenched and his face was as red as a sunburned beet. Clearly, he was in the grip of some powerful emotion. A high school Theatre Arts teacher would have had no trouble analyzing his condition. Wilmar was registering disgust.

'Freddie, I'm dropping out of the contest. You can go to the dance with Cynthia.'

Freddie was astounded. 'Wilmar,' he said, 'I'm astounded—'

'And not only that,' continued Wilmar, 'but I've just this minute finished my program. Here,' he handed Freddie a box of cards, 'take it to Cynthia and have a good time.'

'Well, I'm glad you finally came to your senses. I want you to know, old parsnip, that Cynthia and I will never forget this.' Freddie grabbed the box and, like the young lad who bore mid snow and ice, the banner with the strange device 'Excelsior', he raced towards the library where he knew Cynthia would be studying.

'Cynthia,' he gasped when he finally found her, 'look what I have here.'

'Why Freddie, I do declare, your friend Wilmar is one of the rudest people I've ever met. Not five minutes ago we were talking and then, for no reason at all, he just walked away. I've never been so insulted in my entire life.'

Freddie was puzzled. Wilmar did that? Well, never mind Look at what I have here. It's the program. It works perfectly — now you won't have to miss the dance.'

Cynthia smiled at him. 'Freddie, you'all are so kind to li'l ole me, but it doesn't matter any more. I've decided to drop the computer course.'

'What!'

'Well, I just don't see why I should spend all that time working on the computer. After all, as I was just telling Wilmar, it's just a big ole dumb machine anyway...'

'The computer is just a big old dumb machine?' repeated Freddie slowly. He was all a doodah.

'Why yes, and I was getting tired of spending all my time with a silly ole machine and — why Freddie, wherever are you going? What about the Fuit Ball?'

'Sorry,' said Freddie over his shoulder, 'but I think I'm going to be busy that night.'

It was five minutes later that Freddie walked into the computer room to find Wilmar staring absently at a printout looking for all the world like a large balloon that someone had let the air out of.

Wilmar looked up. 'Freddie—'

'Wilmar,' said Freddie, 'she said it was a dumb machine. She called the computer a dumb old machine.'

'I know Freddie,' said Wilmar in a tone that implied that she was more to be pitied than censored.

Freddie fell silent. He stood on one leg and then on the other. Then he switched back to the first leg. He twiddled his fingers and gave a slight cough. 'You know, I really didn't mean it when I said that you couldn't program your way out of a paper bag. And I have a confession to make. It was me that took all the print statements out of your program.'

'Oh, that's all right', said Wilmar. 'And by the way, as long as we're on the subject of confessions, I was the one that deleted all the left parenthesis from your program.'

They both looked down at their feet; two strong men deep in thought.

A moment later Freddie looked up. 'It just struck me. It's been a long time since we worked on our program to print Thursday calendars.'

'That's right', agreed Wilmar.

He smiled. 'Say, why don't we go work on it for awhile right now?'

'Great idea. By the way, I don't know whether or not I mentioned it to you, but I just got a copy of Dijkstra's new book.'

'You don't mean 'Learn How to Write Perfect Computer Programs by Looking at Pictures', do you?'

'None other,' replied Freddie. 'Would you like to look at it?'

'Would I?'
They looked at each other.

'Friend,' said Freddie.
'Pal,' said Wilmar.

Paul Walden 8T4

The Cleaning Lady

Katie's hands were shaking so badly it took her a minute to get the key in the ignition. As she backed out of the driveway she took a final look at the house; then she drove off, the tires digging into the ice.

Katie was just straightening up the living room when the doorbell rang. She jumped a little at the sound — it was only quarter to nine — and as she went into the hall she glanced around to see that the house looked presentable. The doorbell rang again.

She was the biggest woman Katie had ever seen—not tall, she was at least six inches shorter, but so...so *wide*.

"Hello. You must be Lily.'

"Yes, Missus."

"I wasn't expecting you this early." Maybe that was the wrong thing to say. "Here, let me take your coat."

There wasn't room for the two of them in the front hall, and Katie had to back up while Lily struggled out of the shabby garment. It looked too small, like it had been bought in leaner days; now Katie saw arms like three trunks—Martin didn't have that much muscle, she was sure. And if he did, he sure never used it.

They went on a tour of the house: she apologized for Doug's and Diane's rooms, they were a mess but she wasn't allowed to clean them; the master bedroom, with a washroom behind that door; on this level, the kitchen and living and dining rooms; and downstairs another bathroom Martin's study, and the rec room, don't spend too much time on it, nobody goes in there anyway. As they wandered through the great, empty house, Lily whistled and mumbled to herself; Katie imagined that she had never seen a house like this one.

"Missus Black, you ever hadda Cleaning Lady before?"

"No. Why?"

Lily smiled, crooked teeth like broken porcelain. "'Cuz if you did, you were robbed. You gotta powerful dirty house here." Katie was shattered. "Well, I...'

"Guess that's why you called me." She held up a plastic bag she was carrying. "I'll just go change and then I can get started. I gotta lotta work to do here."

"Are you sure you wouldn't like a cup of coffee first? It isn't even nine."

"No, thank you Missus." And the hall light fixtures shook as she marched toward the back stairs.

Katie went into the kitchen and poured herself another cup. Maybe this wasn't such a good idea. She bent down under the sink and started taking out cans of polishes and aerosol cleaners and putting them on the counter.

'Oh, Missus, don't bother yourself with them." Katie turned around. Lily was dressed in a green crimplene dress, with furry pink slippers and a red bandana tied around her head. She reminded Katie of someone, but she couldn't think who.

"I don't use those cleaners. They're No Good, No Good At All." She held up another bag and pulled out a jar containing a viscous yellow liquid, streaked with red. 'I make my own. Do you have a bucket?'

Katie retreated to the master bedroom and turned the television on. There was no sound; she was going to turn the volume up, but a commercial came on and the parade of mute images fascinated her: a haggard woman looking around her kitchen in dismay; a beautiful woman, entering with an aerosol can; a closeup of the can, with the words GLO 'N' GO filling the screen; shots of the spray eating through greasy black layers of baked-on grime; the woman, transformed as if the product had also wiped years off her face; a man entering, looking around the kitchen, and mouthing the words "I Love You', or "Glo 'N' Go", or something. The last shot was of the can, standing on a shiny countertop.

Katie wondered: Glo 'N' Go...go *where?*

There was the sound of feet below, dragging something heavy across the living room carpet. Katie went to the door and called down.

"Lily, just give me a shout if you need anything." No answer. "Lily, just..." The noise of the vacuum cleaner springing to life drowned her out. She shut the door and returned to the television.

The phone rang. It was Martin.

"Hi, Honey. I'll be late for dinner again."

"The cleaning lady is here. I think she's going to be really good for us."

"Yes, I can hear her in the background. Shouldn't you be down there with her—keeping an eye on her?"

"Oh, I'm sure she's all right". After all, she had given *impeccable* references—even from a rich family that lived on Graceland Court.

"Okay. I'll be home around...suzette, I *told* you not to file those, you don't know how...Look, I've got to go, I'll see you later, Have a Nice Day."

Katie met Martin when he was in the first year in the Faculty of Architecture, and he charmed her with his fantasies of great buildings in which people would accomplish great things. When they were engaged, he drew up plans for a lit-

tle home where they would spend their lives together. But then the professors abandoned Form for Function, and to pass he had to bend to their will. As she watched through the years, the scrolls and filigrees disappeared, and the romance seemed to fade from his blueprints. It wasn't until they were married that she realized that the plans for the house had changed. Now Martin's home was his castle; everyone else got Public Housing.

She was driving south on Gateway Boulevard. She heard a whistle and slammed on the brakes, stopping inches from a crosswalk. The beefy crossing guard, whistle in mouth, glared at her and stepped in front of her car, holding up a small STOP sign. A flock of girls in kilts and white blouses meandered across the street into the private school.

Around noon the roaring of the vacuum seemed to fade a little; Katie went down to the kitchen and saw the extension cord trailing down the stairs into the rec room. She had *told* Lily not to bother down there! When she reached the landing, she couldn't believe it—Lily was vacuuming the felt top of the pool table.

"LILY! LILY!" Lily was oblivious, using the crevice tool to suck up the fuzz that had accumulated around the side pockets. Katie stormed over and tapped her shoulder.

"LILY, WHAT ARE YOU DOING? YOU SHOULDN'T WASTE YOUR TIME DOING THIS!"

Lily stood up straight and gave her a look...then bent over and shut the vacuum off. The noise died away, but Lily still spoke loudly.

"Sorry, Missus. I'm finished down here now."

"It looks lovely. Why don't you come and have some lunch."

"Oh, no thanks Missus. I din't bring lunch."

"I'll make you something."

"No thanks. I still gotta lotta work to do."

"Well at least come have a cup of coffee."

Lily gave in. "OK. I'll just gather up my things."

Katie returned to the kitchen. She hadn't noticed how clean it was—it *sparkled*, it really did. Lily came up, cradling a pile of dirty rags in her arms.

"Can I put these in the sink to soak?"

"Oh, here. Give them to me."

"S'OK Missus, no need to dirty your hands." She started filling the sink with hot water, so hot that a thin vapor rose from the surface.

"Be careful, Lily, that water's awfully hot."

"If you really want them clean, you gotta use Hot." She plunged the dirty rags in and pushed them to the bottom, humming a Gospel song as she kneaded out the grime.

"I'll just let these soak while I have my coffee." She wiped her hands on her dress and turned to Katie, all smiles. "Will you come and have a cup with me?"

Katie had just finished setting two places. "Of course. Would you like some petit fours?"

"Oh yes, please." As Katie walked to the refrigerator she glanced at the sink; the water had turned a dark green-brown, like bile. Had that come from *her* house?

They sat at the kitchen table: Katie, pale, thin, and cold; Lily, dark, not so thin, little droplets of sweat beading on her forehead.

"...but as you see, this is a big house...*too* big for me, I can't do it all by myself."

"Do you work?"

"Well, no...but the kids and Martin, they have their own lives, and I have the Community Centre, and the hospital, and judo class."

"Judo?" She smiled.

"Yes. It's good for you — helps keep you fit." She cleared her throat. "In fact, I was thinking I'd go to class this afternoon, that is if you dont' mind being left alone."

"Oh, no Missus, I'm used to being alone." She took the last pastry. These are delicious. What do you call them?"

Katie left right after lunch, even though her class wasn't until two. She drove to a shopping mall and bought a can of clams for clam chowder; then she had nothing else to buy, so she wandered from store to store, filing in with the other shoppers, the background music lulling them into slow motion. She was tired by the time she got to class, and she couldn't concentrate. She was paired off with a fat man who looked like he hated women; they circled each other on the mat, and he grabbed the collar of her robe and threw her flat on her back.

When she got home Lily was working upstairs. She went downstairs to put her robe into storage, and stopped in her tracks on the landing. Doug was all alone, playing pool. She hadn't known that he knew how.

Doug turned surly when he was about thirteen; Katie had humored him, telling herself it was just a phase. Doug was now in his second year at university; he was studying Anthropology. Everyone had their theories about why; Diane said it was because it was a "bird" course. Nobody thought it was because he had a great love of people. Martin had long one-way talks with his son; he would tell him he should be a professional, and Doug would look at him and say, "A professional what?" Katie stayed out of it.

"How was school?"

"Not bad. We studied australopithecines."

"Good heavens! What are those?"

"Missing Links." He stopped to chalk his cue.

"Have you met Lily?"

"No, I just got home. She did a good job in my room."

"You don't mind her going in there?"

He looked up at her. "Why should I? I've got nothing to hide."

Lily finished twenty minutes late. The house had been transformed; Katie had to admit that maybe it *wasn't* too much for one person.

"I don't know how to thank you. Would you like a ride to the bus stop?"

Lily was counting the bills. "Oh, no thanks Missus. It's just a short walk." She put her coat on and gathered up her bags. It was dark

out. "I'll come again same time in two weeks."

"Yes, that'll be fine." She opened the door and let Lily out. "Thanks again."

Diane passed Lily in the driveway. When she got inside she took her mittens and hat off and tossed her hair back.

"Who was *that?*"

Diane was the best student in her high school. She had a special gift for physics; the principles of Gravity and Relativity came easy to her. She seemed stuck in the Sixties, even though half of that decade was over before she was even born; she grew her blond hair long and straight and played optimistic singles on her stereo. competing with the angrier modern music coming from Doug's room. At the dinner table, she would talk enthusiastically about the latest developments in her field; but nobody could follow her, and she started eating early or late or, more often, not at all.

"What time is Daddy coming home?"

"He'll be late again. You have time to go do some homework".

"Yes, Mother." She went up to her room while Katie went back to set the table. There was a shriek and she dropped a glass; it shattered on the floor. When she got upstairs Diane was standing, hands on her hips, in the middle of her room. It was...*immaculate.* She looked strangely out of place.

"What has she *done?!*"

"Don't you like it? It looks a lot neater."

She stamped over to the bookshelves and started pulling out texts and tossing them on the floor. "She's got these all out of order."

"I didn't know they were in order."

"Oh, wow. They're supposed to be arranged by *author*, not *size.*"

"I'll tell her not to do your room any more."

"No, she can still do the rest of it, but just tell her to leave the books alone." She sat on the floor and looked balefully at the pile next to her. "She shouldn't interfere with things she doesn't understand."

Martin came in at eight, and Katie met him in the hall.

"Well, what do you think?"

"Think? Oh." He looked around. "Well, this is very nice, isn't it!"

"I thought so." They moved into the living room.

"Gee. Even the velvet on the sofa seems...fluffed up." He moved to the dining room. "Looks like it's never been used. One of the prisms is missing from the chandelier." "Really? Oh yes, I never noticed that." She followed him into the kitchen. "So do you think it was a good idea?"

"I sure do. A good investment." He turned around and kissed her. "I'll just go wash up." It was a ritual; he always washed his hands for ten minutes when he came home, like he was scrubbing for surgery instead of dinner.

Up ahead there was a tie-up; there had been an accident. A truck was lying in the curb lane—an Alaska Ice Cream truck, the clown face logo on the side, grinning up towards the sky. There were cartons of ice cream all over the street. There was a group of people watching from the curb. An ambulance pulled away from the scene and went screaming down the street. She turned right onto Domino Avenue.

In the following weeks, the doorbell would ring precisely at nine; and there would be Lily, in her boots and coat, an old red pillbox hat crowning her head; she looked like someone from the Salvation Army. Katie wanted to help her, but she wouldn't let Katie do heavy cleaning, so she spent her time putting the record collections and photo albums in order. She always seemed to be working in the same room as Lily, and when she ran out of things to do she would just sit and watch. Lily explained that all the house needed now was Maintenance; but as Katie watched her, pushing the vacuum cleaner through the carpet as if she were plowing a field, it looked like she was still...*preparing.* She was the strongest woman Katie had ever known. When four o'clock came, she was glad to give her a ride to the bus stop—it was the least she could do, drive her friend to the bus. And when she got back, Doug and Diane were usually home, and Martin seemed to be able to get off work early, and for a change they could all sit down together for supper, like a real Family.

One night, Katie decided to make the clam chowder. When she reached for the can of clams, it was gone. She knew exactly where it *should* be, she had just that day organized the canned goods; it was definitely gone. She told Martin about it.

"Are you sure you checked all the cupboards?"

"Yes. I know Lily took them."

"Now, you don't *know* that. Could you have put them elsewhere?"

"No. I can't figure out why she would want them."

"Well, I wouldn't get too upset about them. I mean, they're only *clams.*"

A ball rolled out in front of her and she stopped. A red-haired boy ran out onto the street and gave her an accusatory look, then grabbed the ball and ran back onto the sidewalk.

They were eating lunches together; Lily offered Katie half of her sandwich.

"No thanks, Lily." She could never identify the meat used.

"Well, it's not good to just drink that coffee. She took another bite. "You're so lucky, Missus—you got such a nice Family."

"How do you know? I mean, you've never met them."

"I can just tell from their rooms. Now my kids, they're No Good, No Good At All."

"I'm sure that's not true."

"My son, Bennie, he sells drugs. I'm afraid of his friends. And my daughter, Violet, I can't remember how many times she's been pregnant."

Katie was floored.

"She had a few of them. I look after them now, now that Violet's gone."

"You mean she...died?"

"Died?" She laughed. "Oh, Lord no, she's still The Mother of the Year, but she moved to Detroit or someplace."

"Oh, my. Must be a real disappointment for you and your husband."

Lily muttered something under her breath. "Husband? I ain't got no husband. Their father took all my money and then ran off with some babe he met in a disco. If he ever shows his face around here again I'll kill him." She looked like she meant it.

"Oh, Lily, I'm so sorry."

"Well, I'm not." She looked up at her. "They're their problems, not mine, you know what I mean?"

She said yes, more out of sympathy than understanding.

"Well, I better get back to work." She went to the sink to wring out rags. Katie looked off into space. You think you've got problems.

"Oh, Missus, I forgot to tell you. I found these in your daughter's room." She held out a half-empty disc of birth control pills. "They were lying under that fancy table. What are they?"

Katie could barely speak. "I'm not...sure."

"Well, I wanted to give them to you—they looked pretty Important.

After dinner, she gathered up her nerve and calm and took the pills up to Diane's room. She knocked on her door.

"Come in."

Diane was coiled up in her beanbag chair, reading a *Sixteen* magazine. Katie held out the pills.

"Lily found these."

"WHAT? Oh, so now she goes through *drawers*, does she?"

"She saw them under your vanity."

"They were *in* the *drawer*." She spat the words out. "Are you going to believe that...that *Aunt Jemima* over me?"

That was who she reminded her of. "How dare you." She tossed the pills into her lap and left.

That night Katie had a dream. She was weeding the garden—she had always wanted a garden, but the house took up most of the lot — and she felt something small and hard hit the back of her neck, then another, then another, then a thousand tiny pellets, like God was shooting at her with a B-B gun. They didn't feel cold like hailstones—in fact, they were rather...*warm* — and when she looked around her there were bright yellow tablets all over the ground. She ran inside. Diane was standing in the back hall, hands on her hips, wearing a violet miniskirt.

Katie went into the kitchen. Doug was sitting at the kitchen table with Katie's mother and father — they had died years ago — juggling billiard balls and telling jokes. He laughed after each punch line, but they just sat there with grave expressions.

She looked out of the kitchen window. The pills had stopped, but the bed of flowers was withering.

The doorbell rang. She ran to the front door and made sure it was locked. When she got back to the kitchen Lily was there. The room seemed to emanate light.

"You go rest now, Missus."

"No, I want to do it *myself*!"

A fire-red aerosol can stood erect on the countertop. It was covered with warnings — a skull, a flame, a cross. It was pulsating, vibrating. She reached for it and it hissed out spray, little droplets floating down to the floor. The linoleum sizzled.

Lily picked up the can and started to spray the refrigerator. The aerosol ate through the door. She moved to the cupboards.

"Lily, that's clean *enough!*"

She sprayed the cupboards. The paint blistered; the wood smoked. A glass fell slowly and shattered on the floor, the black tiles now pitted and warped.

"Lily, I *said* that's clean *enough!*"

Lily whirled around. "Don't *you* tell *me* how to run a house!"

She was walking towards Doug. Katie tried to move, but her feet were stuck. She tried to shout, but couldn't.

Doug held up a handful of green capsules. "Aren't these Bennie's?"

She sprayed him in the face. Katie watched, horrified, as his face seemed to melt away in layers—first a clown face, then a mask of tragedy, then a very young face, then a very old, then...then *nothing*.

Martin entered. He held up a plastic bag of fish and chips.

"Your favourite!"

"Did you see what she just did to Douglas?"

"Yes. Your *favourite*."

"I hate clams.

"They're not for *you*. He walked over to Lily and kissed her. That was when she woke up.

She was going down Delta Road, in the industrial section of town. Suddenly the car radio became filled with static. A man with a hunch back was standing on the shoulder, smoking a cigarette. His once-white dungarees were caked with soot. He looked like a little human smokestack.

Lily got later and later; this time she was a half-hour late, and Katie was worried. She stood in the living room, looking out the window. A Cadillac pulled into the driveway; it was the biggest car katie had ever seen. When the door opened and she saw Lily get out, she had to sit down.

The house was strangely quiet that day; the vacuum cleaner stayed in the closet, and even though Lily took two twenty-minute breaks and a full hour for lunch, they didn't seem to have much to say to each other. Lily left early.

That night she was putting the laundry away. She opened the top drawer of her dresser and started putting in the panty hose and panties thinking about...she froze. A long time ago, Martin had bought her a pink satin nightgown. She hadn't worn it in ages. but it had always *been* there. And now it was gone. The chandelier crystal. The clams. And now, lingerie. She told Martin.

He laughed. "Sounds pretty kinky to me."

"*God*. Martin, this is no joke."

"Okay, calm down. You

probably just misplaced it."

"I *didn't*."

"Maybe Diane took it."

"Martin!" She was shaking. "Lily *stole* it!"

His face hardened. "Well, I mean, it isn't as if you *need* it or anything."

"I'm afraid of what she's going to take next. I'm going to have to get rid of her."

He signed. "Well, if I were you, I'd think about that."

Now she was miles from home, driving down a one-way street. She heard a noise off to her left. There was a pack of mangy German Shepherds knocking over garbage cans; there was garbage all over the sidewalk. One had found a bone, and the others were trying to wrestle it away. She could see their ribs, heaving in and out. She blew her horn, and they all looked up at her with red eyes, then went back to their fighting. The light turned green and the car behind her blared at her, so she drove on.

Katie lay awake all that night, staring up at the ceiling, afraid to move in case she disturbed the man lying next to her. She had always wanted a clean house — well, not *always*, but she had wanted one. Not that it was a status symbol any more; all her friends who worked were too busy to come to the house, they were too busy to *call*, and even if they had seen it they wouldn't have cared—they *couldn't* have cared. But she still felt that her place was there, in the home. And Lily's potions seemed to have some magic ingredient in them that drew the family back together. It seemed like those commercials were right; as long as she kept things tidy they would appreciate it—and her. She thought about that for a long time.

This was the place. She parked on the street and slid out the passenger side. As she started to walk toward the building, a cold wind blew over her; her eyes were starting to tear, it was so cold. The apartment tower loomed ahead of her, a slab of concrete perforated by small windows. Martin might have designed it.

She waited in the lobby, pretending to be going through her purse for keys, until a man came and unlocked the door. She went in behind him and they got on the elevator together. It wasn't until the doors had closed that she turned and saw how really suspicious he looked. As they rode up together, he looked her up and down, and for the first time she wished that her artificial fur didn't look so real.

The halls were painted dark yellow; at least she assumed that was the original colour, they were so soiled it was hard to tell. As she walked towards Lily's apartment, she noticed a large, amber smear—an old bloodstain — spreading along the wall.

She rang the doorbell; there was no answer. There was a peephole at eye level. She rang again. She heard feet—heavy feet, she knew it was Lily. There was a pause, then the door opened.

A man who looked a lot like the other man was standing there, looking at her.

"Yes?"

"Oh, I'm sorry. I was looking for Lily White."

"Yeah, this is her place. Come on in." He went down the hall into a back bedroom.

Katie moved into the living room. There were empty beer bottles and old magazines everywhere. Above the television, there was a felt painting of Jesus. Something foul was simmering on the stove. Katie wondered why she had thought she had anything in common with this woman.

Lily shut the bedroom door and walked slowly down the hall to her. She looked old, older than ever. She also didn't look surprised to see her.

"Hello, Missus Black."

"Hello, Lily."

"Are you here to fire me?"

Katie was startled by the question. She was even more surprised by her answer.

"No, Lily, you've done a fine job. You didn't miss a spot. But I won't be needing you any more."

"Oh, but Missus, how're you gonna keep that big house clean?"

"I don't know." She started to move to the door. "I'll send you a letter of reference." An *impeccable* letter of reference.

Lily smiled. "Are you sure you won't stay?"

"No, thanks Lily." It was time to Glo 'N' Go.

But...*where*?

John Young 8T2

SCIENCE FICTION

The wizards sit in the conference room
Of the big ship slicing through the void
Racing across the universe
From the limits of time to your own back yard

Their heads are swollen with the big ideas
Their white robes cover the bony points
They hit some turbulence, bob about
Their liquid brains jostled from side to side

The One they have chosen their leader now speaks,
A hydrocephalic prodigy
Snatched from his mother's tender breast
And welded into the silver throne

Beware the Space Invaders, he says,
Partake not of the Village Squash
They raise their useless hands to vote
Deciding who will live or die

Under the cold fluorescent lights
Playing Mega Let's Pretend
The ship moves onward, ever on,
Going nowhere at the speed of light.

John G. Young 8T2

The Show

This boring show is life.
The act begins early.
Learning the frills, the guises,
Learning to pretend, to feign, to deceive,
Getting caught in the web of formality.
Building our sturdy walls around us,
Thinking that we are safer
But blocking out only our feedom.
It's all a sham and we know it
But we are satisfied to live in our
mental chains,
Content to be controlled
By these respected rules and expectations.
No human being lives inside anymore,
As we are quickly turned to stone.
Our heart desires to open
But we simply deny its existence
As we become the obedient robots,
Pretending we are alive.
Life,
Being automatic,
Was easy.
But as the curtains close,
There is no appaluse.

Jagpreet Arora 8T5

i remember the bull calf

she was old now, the old woman.
they propped her in the metal chair
geriatric bones left to sit (and knit)
conventionally.
then they waited.
still she held herself
unbended
and i would say even proud
in the way she looked at us
and said nothing.
i thought of the old Victoria, with grey hair
and history within her eyes.

"she would be better there," she had said
(daughter to husband) as she ate
the frozen yogurt and
watched the expiry date.
"the nurses would watch her and feed her
and there would be people her own age there.
it would be better there."
outside
the snow wrapped the ground in a torn blanket of white
and the trees stood out
in all their bare nakedness.
from behind the closed window i
thought i could hear the wind cry,
sounds soft and low
like a young woman making love, or a child
at a bare breast nuzzling, and being fed.

then the old woman coughed and coughed again,
slumped and made no wove to uphold herself.
saliva gathered at the corners of her mouth.
and as i watched the tears cloud her cataractless eyes,
a nurse with white Kleenex
shifted long enough from "Another World" to wipe
the subtle signs away.
I turned away and wept.

nigel n. jagan 8t3

TICKET SALES

TUES., MARCH 2	YEAR I
WED., MARCH 3	YEAR III
FRI., MARCH 5	YEAR II

SHOW DATES

TUES., MARCH 23 — SAT., MARCH 27
8:00 P.M.

HART HOUSE THEATRE

Canada's Little-Known Medical Past

Paul Boughen 8T3

Rogues, Rebels and Geniuses: The Story of Canadian Medicine. Donald Jack Doubleday, 1981. 627 pages, $24.95.

Who was Mahlon Locke? Joseph Workman? Do you recognize the name Maude Abbott? Daniel Parker? Herbert A. Bruce? Do you know the story associated with Gustave Gingras? How about James Collip?

According to Donald Jack, the author of a new book (October 1981) entitled *Rogues, Rebels and Geniuses*, we should be familiar with these personalities and their contributions to Canadian life.Indeed, these names, belong to Canadian practitioners of the past century or so — some country doctors, others influential administrators, but all of whom have had unique medical careers due in large part to the nature of the country and its people and the peculiar demands and attractions of practicing medicine in Canada.

I wondered when confronted by the word "story" in the title whether this was yet another rendering of the Banting and Best story, or of Norman Bethune's erratic career, but thankfully it wasn't. It was a pleasant surprise to find that *Rogues, Rebels and Geniuses* is in fact a lively anthology in the form of a Canadian medical "story book". In a very readable manner, Donald Jack presents the stories about "those doctors whose lives most dramatically exemplify the spirit of Canada, medicine and Canadian medicine" (as the foreward states).

As a further product of the ongoing search for 'Canadiana', this book introduces the contributions of Canadian doctors to the national awareness stage. The early chapters of the text follow the development of medical practices and discoveries worldwide but focus on the roles that Canadians played whenever appropriate. The healing arts as practised on Canadian soil are introduced by a brief description of the techniques of the Indian medicine man and, subsequent developments are described chronologically as they parallel global medical events. Later chapters concentrate on the lives and careers of specific Canadian physicians and surgeons.

The book is not just a national medical diary; each of the stories about one of the various 'rogues', 'rebels' or 'geniuses' is told in full before moving on to the next: making the reading light and enjoyable. The chapters are thus individual narratives, bound together by their common theme — medicine and its peculiar mode of delivery in Canada.

The text is generously sprinkled with humorous anecdotes which often are quotations from the writings of a principle character. Donald Jack, on many occasions, seems to be aiming a good-natured poke at the profession and his particular narrative style is well suited to showing the humour in (what) must have been difficult situations. Never the less, one gains an insight into the raw, harsh, but in an odd way, friendly land that the men and women of the book came to know so well.

Donald Jack's output includes the four volume *Bandy Papers* which on three occasions earned him the Stephen Leacock Award for Humour, as well as 41 television productions, 4 live theatre works and many other writings and media presentations. Donald Jack is, therefore, at first thought an unlikely author for a book in this vein, but as a doctor's son and having done much medical research for film and television projects, he very competently portrays the lifestyles of Canadian doctors in the various historical settings.

It is unfortunate that the study of medical history does not occupy any role in the medical curriculum. It is easy to traverse the entire four year course without being exposed to the subject at all. Perhaps it is hoped (however naive such a thought might be) that members of the profession will at some point satisfy any personal curiosity through their own reading. *Rogues, Rebels and Geniuses*, as an introduction to only one country's medical history, makes such a pursuit extremely pleasurable and interested readers will find the bibliography useful. Another feature of the book is its appendix of capsule biographies of prominent characters in the book. This provides quick reference to the many names introduced in the text and acts as a group of chapter

(continued on page 112)

Doctor, Lawyer, Beggerman, Thief...

Philip Hébert 8T4

There is something terribly dismaying about contemporary debates concerned with the earnings of doctors. What is dismaying is the lack of moral *range* of the debate. The argument has been more concerned with the statistics of salaries than the adumbration of acceptable principles of conduct. I think here of the morass of facts that is mobilized by the OMA purporting to show how poorly doctors are faring *vis-a-vis* the incomes of other professional groups and so how due doctors are for another hefty hike in fees. The problem with this view, as I shall try to argue throughout this article, is that it fails to make explicit its underlying principles, and moreover, that these principles are unacceptable ones.

It is not my intention here to introduce any statistics that would meet those of the OMA. Instead, I take it as an undeniable fact that the living standards of North American doctors are far and away elevated above those of the vast majority of the world's population and, indeed, of the continent's population. To support this it seems sufficient to note that, according to the World Bank's 1980 estimate, 800 million people are 'absolutely impoverished': "a condition of life so characterized by malnutrition, illiteracy and disease as to be beneath any reasonable definition of human decency". To these people who lack the meagre resources for even bare survival must be added the many hundreds of millions more who comprise the world's poor. Compared to these people, doctors possess riches beyond the wildest dreams of the poor.

These facts are important because they will help us see why current arguments purporting to show the 'unjustness' of doctors' earnings can do nothing of the sort. Thus, for example, it has been argued that the earnings of doctors can only be compared with the earnings of other professional groups.[2] Let us suppose it is true that doctors' incomes have fallen behind those of dentists and accountants. How could this be thought of as a justification of doctors' earnings? It could only be considered a justification if you believe doctors, dentists, and professional groups generally, to be a species apart from the vast majority of the world's population. Supplied with its missing premise, this argument would suggest that, because doctors and other professional groups have done well in the past with respect to everyone else, they should continue to do as well in the future.

Such an argument is neither sound nor acceptable. It is not sound because it is fallacious: common practice or past practice is not a defense of the *rightness* of high income ostensibly due doctors. The traditional argument is not acceptable either, because it is not a *moral* argument. A moral argument is based upon only those principles compatible with a universal point of view (they are acceptable because they are in everyone's best interests). In ethics each person's interest counts as *one* interest and everyone's interests must be counted. We must, then, take into account the interests of all those affected by a decision we propose to make and not accept a proposal simply because it represents the interests of oneself or one's group. My interests, simply because they are *my own*, cannot count more than the interests of anyone else[3]. Partial or sectional interests are not yet moral ones.

It is easy to see how this basic idea of ethics applies to the contemporary debate over the earnings of doctors. Those arguing for the maintenance of doctors' traditional incomes are arguing for their own sectional interests — they make little attempt to show how such a view can claim to represent the interest of everyone affected by such a decision. Thus, there is certainly no attempt to show how maintaining doctors' earnings could possibly help those living in dire poverty. It is clear, rather, that the opposite is true: by suggesting we continue to marshall scarce resources to uphold doctors' incomes, such a view would only further deprive the world's poor of resources they already lack.

This is because the resources for doctors' earnings must come from *somewhere*. In a world of scarce resources, making more resources available to doctors (or *continuing* to make available to them what

they have traditionally received) generally means depriving others of those resources. The line of causation is not quite so direct as stealing rice from a starving child, but it is there nevertheless. The world-wide web of the international economy dictates that the advanced countries of the West obtain their wealth by depriving less countries if theirs. The result is, as the Brandt Commission Report puts it, that:

"The North including Eastern Europe has a quarter of the world's population and four fifths of its income; the South including China has four billion people — three quarters of the world's population but living on one fifth of the world's income."[4]

Whatever the cause of this situation, upholding the traditional earnings of doctors contributes to the tremendous disparities in standards of living in the world today.[5] In not doing what we could to alleviate this situation, we contribute, albeit in an indirect way, to a world order that condemns millions to die before their time for the lack of the most basic human requirements. We omit to act in a way that could alleviate death and human suffering. We would consider it wrong for a doctor to omit to perform an act that could save a patient's life yet it is just as wrong as this to omit to perform acts that could save people otherwise committed to certain death by starvation or by lack of adequate medical facilities. Such acts — refusing to accept an increase in or already inflated salary, contributing large sums of disposable income to groups concerned with the world's dispossessed — are clearly within our power to perform.

The fact that the world's poor are not next door neighbours does not make our acts of ignoring them any more justified. It merely provides us with an excuse for not doing anything in their aid. *Omitting* to do what is within our power to do — and what is to be morally expected of us — is not ultimately morally distinguishable from *acting* in a way that would condemn others to certain death.[5]

If the principle of equality demands an equal *consideration* of interests, it does not demand an equal *treatment* of interests.[7] In some cases some interests will be treated differently than others. Thus, if I have but 500 grams of rice to distribute, I should not divide it equally between one who is starving and one who is well-fed. This same principle — that of addressing *needs* and not simply interests — applies to the present debate. For how could it possibly be justified that doctors should continue to receive their traditional earnings in the face of the certain death of many millions? It cannot be justified morally. It can only be justified on pragmatic grounds: doctors alone can do little, millions would die anyway, doctors would otherwise leave the profession in droves. None of these objections, however, survive inspection.

To the first it can be said that, even if it were true that doctors could make little difference, this would not absolve then from doing what they could do. To the second that we can no more refuse to save some from dying, on the possibility that they may die in the future anyway, than we could refuse a patient with chronic reral failure dialysis because he may still die. As to the third objection I could only argue (and hope) that people do not by and large enter medicine for money. If they do not go into medicine for money, then we may be wasting resources by paying doctor's more for what most of them would do anyway.

In this last statement I am not being facile. I am suggesting that we, as doctors (-to-be), are lucky in having a profession immensely challenging and satisfying. This is not true for most people, condemned as they are to mind-breaking and back-breaking boring, repetitive jobs. There is an argument that people who are so unlucky should receive monetary benefits that could help *outweigh* the drawbacks of their labour. This is comparable to the example of dividing the rice above. There it was seen to be better to divide the rice so as to equal the differences between the two people. It is better to meet needs than simply treating all interests as if they were alike. But, if we continue to pay those with interesting careers the best incomes, we are rewarding those already rewarded and so magnifying the differences between people. If we are concerned with the equality of needs, we should be more concerned with *reducing* these differences and so compensating those with inhumane jobs.

This is not to suggest that those who defend the traditional earnings of doctors are moral monstors. It is to suggest there is a lot more to the issue than facts and figures. There is a deeper set of difficult moral concerns that must be addressed by anyone claiming to justify their actions morally. The appropriate response to this troubling affair is neither guilt nor despair. It lies in asking how we may cease to be passive recipients of the traditional allegiances of our professional group and begin to be effective social actors concerned to alleviate terrible world circumstances.□

Footnotes

1. Teresa Haytes, *The Creation of World Poverty*, P.18
2. John Tallon, *The Auricle*, Jan. 8, 1982
3. P. Singer, *Practical Ethics*,p.12. Such a view demands that you put aside your personal likes and dislikes and imagine yourself in another's place. Would you still feel your conduct is right? If you were an imporerished pensioner, would you still think that doctors have a right to their traditional incomes?
4. T. Hayter, op. cit., pp. 16-17.
5. It therefore seemed an ironic twist that on the *same* day that the OMA announced its upcoming one-day strikes in support of its fee demands (a 30 per cent fee increase - following a 12.5 per cent increase last year), the National Welfare Council of Canada announced that 3 million Canadians are impoverished. The distribution of income in Canada has not charged in the past 30 years and gives the top quintile of the population a share of the total income 8 to 11 times that of the bottom quintile c.f. *The Globe and Mail*, Jan. 27 and 28, 1982. pp. 1-2). The world's poor *includes* Canadians.
6. c.f. T. Honderich, *Violence and Equality*, chapter 2.
7. c.f. P. Singer, op. 'cit., pp. 22-23.
8. All of us - doctors or not — have an obligation by the principles of this argument to do what is within our power to achieve in the way of ameliorating the inequalities between people. Doctors, in seeking to maintain their high incomes at the expense of others, are not the only ones to engage in wrongdoing. Query: do doctors, who have as their prime concern the alleviation of suffering, have a special obligation to aid the world's poor?

Comparative Cancer Therapy

A total of 30 patients with advanced brain tumors have been treated in the past two years, using intravenous and oral Laetrile, Dimethyl Sulfoxide, and Metabolic Therapy which consists of vitamins, enzymes and coffee retention enemas. This report is on six patients who have verified brain scans prior to treatment and verified brain scans six-months-to-one-year after treatment. Four patients showed both clinical and brain scan monitored improvement. No clinical or laboratory evidence of drug toxicity was seen in the patients who took treatment one month longer.

Two of the patients had recession of cancer to the point that it is not detected on the brain scans. Amygdalin (Laetrile or Vitamin B17) is one of the many naturally occuring cyanogenicyglycosides. It has been in use for over a hundred years. It is abundantly present in apricot pits and almonds, having been used in the treatment of hemorrhoids for centuries. Over the last twenty years, the public acceptance has assumed astounding proportions as an alternative therapy. It has been legalized in at least 24 of the 50 States, by the use of the Bohanon affidavit. National Cancer Institute conducted a survey, reviewing 68 cases of patients who had been treated with Laetrile and reported favorable therapeutic results.

DMSO (Dimethyl Sulfoxide) has been one of the most controversial substances in the field of cancer therapy and in the treatment of other degenerative diseases, including arthritis. It is prepared commercially by Crown Zellerbach who holds the patent, from tree sap, called lignin. It is inexpensive to produce, contrary to the excessive prices charged by the pharmaceutical industry. DMSO is stable up to 100% in either acidic or alkaline-neutral condition; it is stable up to a boiling point of 189°C. The DMSO molecule is Tetrahedron, the center of which is occupied by a sulphur atom, two methyl groups and oxygen atom and a non-binding electron pair; one located at each apex. The empirical formula is C2 H6 Os and the molecular weight is 78.13. It has an elemental composition of C 30.74, H7.4%,) 20.48T, S..03. DMSO has radioprotective properties and has been shown to protect enzymes, catalaze and ZLDH when exposed to radiation. DMSO protects against lethal effects of whole-body radiation but it is not a clearly understood mechanism. It has been shown to have cryoprotective properties and has the ability to protect tissues at low temperatures. It tends to stimulate enzymatic activity and may change subtrate specificity of enzymes. Studies have shown DMSO in conjunction with phytohaemagolution (PHA) increased incorporation of tritiated thyridine and production of Interferon by lymphocytes of patients with chronic lymphatic leukemia. The dipolar solvent characteristics of DMSO facilitates the entry of catecholamines across the blood brain barrier. It has been suggested that this may be related to the ability of DMSO to serve as a carrier of biogenic amines to trasverse both aqueous and lipid phase of components of the carrier. DMSO has the ability to cross any membrane without destroying its integrity. Numerous studies have shown that it has an ability to carry various other substances of lesser molecule structure. It has been shown to be anti-inflamatory, effects neuromuscular transmission, atibiotic properties and also acts as a diuretic, not to mention a long list of other properties. A significant finding in the use of DMSO is that it affects the growth pattern of tumor cells when in culture, inducing drastic changes from bizarre growth pattern to a pattern that closely resembles normal growth. DMSO in 12.5 - 25% concentration caused complete inhibition of growth in vitro of bacteria regularly isolated from human tumors and leukemic blood, without affecting the intact blood cells. A Chilean study conducted on 65 terminal cancer patients using DMSO, cytoxan and amino acids shows most of the patients had received chemotherapy which had proved fruitless. When the patients were given chemotherapy and DMSO and amino acids on alternate days, both the tolerance and analgesic effect was good.

Results:

Amygdalin preparations were supplied by C.P. Rahdtady of Germany. DMSO was Rimso-50 from Research Industries Corporation in Salt Lake City. No major side effects of DMSO and Laetrile were seen in the patients except a minor amount of nausea and headaches. Some vomiting, chills, fever in some patients depending upon whether radiation or chemotherapy had been given prior to treatment. The patients had the characteristic odor for DMSO. No valid conculsion can be drawn from just six patients, although the fact that 30 patients with measurable areas of brain tumor are surviving is remarkable. Of the six patients, two have had complete regression of cancer, based on brain scan results. Two have had partial regression, based on independent brain scans and two have had prolongation of life. All patients claim they have had tremendous pain relief and feel good. Two are off medication and are back to work on a maintenance dose of vitamins, enzymes and diet.

Conclusion

Various reports have indicated hazards of Laetrile ingestion and cyanide poisoning, as well as, of DMSO and toxicity. In our study, the 30 patients are in various stages of regression. We reported on six who were verified by independent researchers of the decrease in size of the tumors to total remission. No clinical toxicity was observed clinically or verified by laboratory analysis. The drugs were rapidly cleared from the blood and excreted in urine.□

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(continued from page 77)

procedures, and places the healer in the position of transmitter or controller of supernatural healing forces.

"The apparent success of the various healing methods based on different ideologies and methods compels the observer to conclude that the healing power of faith resides in the patient's state of mind, not in the validity of its object; i.e. an 'expectant thrust' in itself can be a powerful healing force"[2].

Faith healing, psychotherapeatically, results in attitude change, even if personal suffering is unrelieved. It may promote maturation of the sufferer's personality so that his integration into a complex & often hostile world is improved. As Frank[2] has noted, spiritual malaise or existential anxiety can be alleviated so that with the development of a more optimistic view towards the nature of God, the meaning of existence, and the nature of the universe, there is a concomitant favourable change in how the sufferer views himself and other people, and in his patterns of social behaviour. Equipped with these new positive attitudes, the sufferer is better able to cope with life's problems. Also, if spiritual problems are manifested psychosomatically, these too may be successfully overcome. Hence there are a host of individual and inter-personal factors which interact in such a way as to evoke a desirable change in attitude and a better overall outlook on life.

Summary

This article has intended to present the topics of faith healing and occult healing in general in an honest, concise and objective manner. Controversial statements about such issues as the existence of supernatural forces have been meticulously avoided at the expense of appearing too analytic. None-the-less it is hoped that thoughts generated from this article are consistent with the view that any form of non-medical healing is not a rival but a complement to traditional medical healing. Although the purpose here was not to validate any form of non-medical healing; surely if the sufferer receives some therapeutic benefit from such healing arts for whatever reason, should not its use at least be considered?□

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(continued from page 83)

Briefly, the spine is stripped of the deep spinal muscles and ligaments as in a normal fusion. The spinous processes are then removed, the facet joints obliterated, and bone graft is taken from the iliac crest (fig. 1). Double stainless steel wires are then passed under the laminae of each of the vertebral levels to be fused. The wires are then cut, and each half drawn towards the pedicles (fig. 2). Two stainless steel L-shaped rods are then bent to conform to the shape of the curve, and placed longitudinally over the two rows of pedicles, forming a rectangle. The rods are then wired to the laminae (fig. 3). Bone graft is then laid over the fusion site, and the incision closed. The instrumentation is so strong that post-operative casting is not necessary, although as always, the strength of the fusion mass will determine the final outcome. In the mean time, good internal fixation and some degree of derotation has been achieved, but correction is still a problem.

Will the Luque Instrumentation replace all pre-existing methods of internal correction? No, since it is primarily a method of stabilization rather than correction. For the routine surgical idiopathic curve, however, Allen's[7] group in Galveston is currently offering the Luque Instrumentation as an alternative to the Harrington method, but ultimately there is a tradeoff between post-operative care and degree of correction.

Conclusion

Although the above operative procedures embody biomechanical principles that are basically 'correct', none (including the Luque Instrumentation) has yet emerged as the definitive operation for scoliosis. The picture that has been developing over the past ten years is that a different operation is needed for each 'type' of curve[5,15]. This approach reflects the clinically heterogeneous etiology of what ought to be regarded as a deformity rather than a disease. Scoliosis patients include individuals with neurofibromatosis, Marfan's syndrome, arthrogryphosis multiplex congenita, cerebral palsy, meningomyelocele, congenital hemivertebrata, and that disturbing large group, the idiopathics. Each represents a different 'type' of curve, and each demands a different and individual consideration.□

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Dr. George E. Wodehouse, Toronto
Dr. M. S. Wolochow, Vancouver
Dr. C. R. Woolf, Toronto
Dr. J. R. Wright, Toronto

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summaries for the amnestic readers.

Although not the definitive work in the field of medical history in this country, it is the realability of *Rogues, Rebels and Geniuses* that recommends it to both medical and non-medical personnel alike — anyone interested in entertaining "history".□